

THE TREE OF KNOWLEDGE

THE AMERICAN BEHAVIORAL SCIENTIST

[formerly P.R.O.D.]

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IN THE NEWS PERSONALIA: • The ABS Advisory Board includes leading scholars in all social sciences, whose manifold accomplishments probably need even less introduction to our readers than we provide here. W. Glenn Campbell is Director, *Hoover Library on War, Revolution, and Peace*. Hadley Cantril, former Chmn. of the Princeton U. Dept. of Psych., is co-founder and Senior Counsellor of *Inst. for Intl. Social Research*. Stuart Chase is a leading thinker and writer in merging social science and society. August Heckscher is Director, *20th Century Fund*. Francis Keppel is Dean of Harvard's Graduate School of Education. Harold Lasswell is Professor of Law at Yale. Herbert Simon heads the Dept. of Indsl. Mgmt. at Carnegie Inst. of Tech. William Wheaton has been Chairman, *Natl. Housing Board*, now directs the *Inst. for Urban Studies* at U. of Penna. • Died: Samuel Stouffer, 60, director of Harvard's *Lab. of Social Relations*, author of *The Amer. Soldier and Communism, Conformity, and Civil Liberties*, on Aug. 24th, of cancer. • Appointments: Thomas Carroll, former v.p. of Ford F., as President, George Washington U.; Fritz Machlup, economist, as Walker Professor of Econ. and Intl. Finance and as Director, *Intl. Finance Section*, at Princeton U. • Senator Kennedy's campaign is being aided by ideas, research from 10 advisory groups, coordinated by Archibald Cox (labor law; Harvard). Members of the *For. Policy and Defense* group incl. W. W. Rostow, Max Millikin, J. Weisner, L. Pye (all MIT), E. Katzenbach (Brandeis), P. Nitze (Johns Hopkins), Z. Brzezynski and E. May (Harvard). *Econ. and Farm Policy* group members incl. J. K. Galbraith, S. Harris, J. Tobin (all Harvard), W. Cochrane (U. of Minn.), P. Samuelson (MIT).

CENTERS AND PROGRAMS: • Stanford is studying possibility of Far East study centers for specialized grad. students in Hong Kong, Tokyo. • Recent meetings: the Exec. Board of the *Intl. Pol. Sci. Assoc.*, in conjunction with the *Round Table on Analysing the Pol. Behaviour of Citizens*, in Ann Arbor, Sept.; a seminar on "the sociology of pol. aspects of econ. development" by the *Latin Amer. Faculty of Soc. Sciences*, in Mexico City, Sept.; Congress of *Eur. Society for Opinion Surveys and Market Research*, Scheveningen, Neth., Sept. 11-16; Symposium on Relationships between Bio., Soc. Sciences, Utrecht, Sept. 12-19. • Forthcoming meetings: *Union of Latin Amer. U.'s* will hold 2nd Conf. on Econ. Sci. at Rosario, Argentina, Oct. 10-15, and 2nd Conf. of Latin Amer. Faculties of Law and Soc. Sciences at Lima in Spring, 1961; *Intl. Pol. Sci. Assoc.* plans Symposium on Functioning of Pol. Democracy in SE Asia, in India, late 1960. • 5th General Assembly of *Intl. Soc. Sci. Council* will meet in Paris, March, 1961.

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Election Polling Trends, 1960

by ELMO ROPER, PAUL PERRY, and MERVIN D. FIELD

We recently conducted a "poll of the pollsters," asking several of the major American public opinion polling organizations what contributions or innovations they were making to improve election studies and forecasting. Elmo Roper and Associates, the American Institute of Public Opinion, and the Field Research Company (which conducts the California Poll) each summarized the directions their efforts are taking. As Elmo Roper points out, there has been much talk of improving the art, but in an election year, at least, the pollsters are not concerned so much with "new directions" as they are with increasing the sophistication of tried-and-true methods. We hope to print other comment following the November election.

ELMO ROPER AND ASSOCIATES

Recent elections have been marked by a good deal of "trade talk" concerning the need for new ways of doing election research, and the need for improvement in polling techniques. This has been accompanied by some new ways of doing election research, as well as some improvements in techniques. But the new ways and the improvements have hardly matched the fanfare—or sales talks—with which they have been introduced. Witness the small-sample, roving-reporter type of research. This tells you how and why the vote is going: "As Joe Smith, who owns his own farm but finds it necessary to supplement his income by working in the new Acme factory in the next town in order to support his wife and five children, put it to me. . . ." Sometimes the Joes have put it right. Often they haven't. And the Joes have even been known to put it at the time and in the way that would be best for the candidate who paid for the research.

Twenty years in any human endeavor should produce some improvements, and election research—or "polling"—is no exception. There are, however, some fundamentals from which this organization is reluctant to depart.

One of these is that the reported results should reflect a measurement of a cross-section of voters, arrived at by adequate sampling methods and using a sample of sufficient size to be meaningful. This we plan to continue, taking advantage of sampling refinements developed during the last

four years.

Another is that emphasis should be placed on issues and voting behavior rather than on prediction. We will know the "which way" of the mandate on November 9th; we want to learn more as to the "why" of that mandate.

Another is that the results of election research (and as much as possible the actual questions by which they are arrived at) should be reported in full, so that the follower of poll results may draw his own conclusions—and not be misled by a half-story.

We would like to report that we are about to embark upon some vast new (and, of course, exclusive) improvements over past election research—particularly improvements of a nature that would let us feel in the months preceding November 8th that we couldn't *possibly* be wrong on what we are bound to be judged by: namely, the vote figures. Instead, in all honesty, we have to report that for the most part, we plan to abide by the fundamentals as we see them. We shall again try to *measure* opinion, not mastermind it, and we will report our results in full—and before the election, not after.

We shall, however, try to make some advances on three perennially thorny aspects of election research: *turnout*—who is likely or unlikely to go to the polls and vote; the *undecideds*—those who can't decide which way their preference lies; and, finally, the use of some more subtle questions, designed to get clues as to the probable behavior of those respondents who, from sheer perverseness, won't tell us how they plan to vote.

THE AMERICAN INSTITUTE OF PUBLIC OPINION

The election survey and estimation process of the Institute's

Gallup Poll is based on personal interviews with persons drawn from a probability sample of election precincts. Within precincts we select a systematic sample of households, and choose one adult for interview from each household by a set procedure. The precinct is used as the areal sampling unit because it provides a political sample control. Any bias in the sample precincts, in terms of the previous Presidential election, is removed by applying a ratio correction to the survey results.

One important variable we must take into account is the degree of voting participation, for since the beginning of the Roosevelt era, characteristic differences between voters have been observed to be correlated with political preference in national elections. Our procedure is, first, to categorize respondents on the basis of their answers to a series of questions about voting participation; we then rank the respondents in terms of their likelihood of voting, and use the voting preferences of those who accumulate to the anticipated percentage of the adult population who will vote. We know that responses to the questions used are related to voting participation, on the basis of post-election studies in national elections of the last decade.

This procedure depends in part upon an accurate estimate of the voting ratio, or proportion of the adult population who can be expected to vote. We obtain this by projecting from past relationships observed between answers to the series of voting participation questions and actual turnout in previous elections.

In our experience, successful projection of the vote split depends on minimizing the undecided vote. We do this by using a forced choice question, asking respondents who are undecided or who refuse to answer to which candidate they are leaning. We have found this more useful than analyses of "undecideds" based on attitudinal questions

related to voting preference or background characteristics.

We deal with the problem of obtaining unbiased expressions of candidate preference by using a secret ballot. The respondent is handed a card that lists the two tickets, and is asked to check his or her preference and to drop the card into a sealed ballot box.

One other major problem is obtaining survey data as close to election day as possible. By using telegraphed and telephoned reports from interviewers, we can obtain results that center about six days before the election. In 1956 we used special measures to carry out a nationwide survey on the Saturday three days preceding the election. The use of precincts as areal sampling units, apart from theoretical advantages, facilitates control of such final surveys. Areas may drop out for various reasons and may be impossible to replace in the time available; in such cases measures of the past political characteristics of the areas provide a partial correction for their loss. The loss has been quite small, in our experience, and thus far has not presented a serious problem.

Candidate preferences are studied in relation to trends on related attitudinal questions, for example, ratings of the candidates using non-verbal scale questions; questions on issues prominent in the campaign and considered important by the voters; and questions concerning party preference and degree of partisanship. The relationships between the answers to these questions and candidate preferences have not as yet been established precisely. The results, and especially the trends they reveal, nevertheless provide insight into the reasons why the vote division between candidates is at a given level and the reasons for any vote trends which may develop.

THE CALIFORNIA POLL We feel that the biggest problem in polling today is that of keeping up with shifts that develop within the two or three weeks prior to election day. This problem includes both the changes of opinion that

take place and the direction of swing among the "undecideds." To help solve this problem we plan to try a program of mass telephone interviewing during the last few days to detect shifts that may occur. We feel that this is very important this year, in view of the probable influence of international affairs on the election. The large impact of the Suez crisis on the vote in 1956 shows what can happen in a short time.

We will also make use of the secret ballot technique in an attempt to detect whether or not the religious issue is having any impact.

We will use the area-probability sample design, and will try to get around the not-at-home biases by using the Politz-Simmons weighting technique and by interviewing in the best at-home hours. We may also use some special "Bellwether precinct" samples to verify trends.

Other than this, we will keep to the tried-and-true methods that have worked well here in previous elections. One observation we have about the California electorate is that it is remarkably homogenous. Geographic regions do not make a great deal of

difference—certainly nothing like New York's "upstate-downstate" differences, for example. Furthermore, California's population is concentrated in relatively small areas of the State, and the "farm vote" is negligible.

Party affiliation in this State is about 60-40 Democratic, but party ties have not been too strong in determining voting behavior in the past. This being Nixon's home State, opinion about him is fairly well polarized. He has both strong supporters and vehement detractors. We could be wrong, but we think this means that there will be less likelihood of a runaway swing either for or against Nixon. Kennedy is still less well known here, a situation that leaves him freer to make considerable inroads among people who are presently uncommitted.

At the moment we see a pretty close race, and we are trying to guard against another 1948. However, we don't want to be over-cautious either. If the data show either candidate leading by a significant margin, we are prepared to believe it and publish it. Let the reader beware!

THE FORCE OF PUBLIC OPINION

By arguing on the "force of circumstances," we have argued away all force from ourselves and stand leashed together, uniform in dress and movement, like the rowers of some boundless galley. This and that may be right and true; *but* we must not do it. Wonderful "Force of Public Opinion"! We must act and walk in all points as it prescribes; follow the traffic it bids us, realize the sum of money, the degree of "influence" it expects of us, *or* we shall be lightly esteemed; certain mouthfuls of articulate wind will be blown at us, and this what mortal courage can front? Thus, while civil liberty is more and more secured to us, our moral liberty is all but lost. Practically considered, our creed is Fatalism; and, free in hand and foot, we are shackled in heart and soul with far straiter than feudal chains.

THOMAS CARLYLE

"Signs of the Times" (1829), in *Critical and Miscellaneous Essays, Vol. II*
London: Chapman and Hall, Ltd., no date, p. 79

The Tree of Knowledge

by GIORGIO TAGLIACOZZO

We believe that information retrieval (IR) and machine translation (MT) developments portend a momentous advance in social science technique. This movement will depend in large part upon gathering agreement concerning language, terms, concepts, and modes of attack on reality. Therefore any endeavor to draw together wide areas of knowledge of man in a single network, such as the systems theory of the biologist Bertalanffy, may succeed in providing the orientation necessary for data coding and processing. In this light Professor Tagliacozzo, who serves jointly the New School for Social Research and the Voice of America, offers a potentially useful basis for deriving systematic categories for the mechanization of data work.

The "Tree of Knowledge," which appears on the cover in reduced form, is a taxonomical chart illustrating the fundamental unity, the genealogical development, the history, and the contemporary panorama of human knowledge. The combined concepts which have made such a chart possible, and which are now predicated by the chart itself, together constitute a *formula* for a unified view of several interrelated and overlapping problems of knowledge and education. They also may provide a clearer definition, a better understanding, and a more satisfactory solution of those problems.

A full description of the chart, with its countless ramifications, is obviously impossible in this short article. In Part I, below, only its framework is outlined. Part II is devoted to an explanation of what we have called a *formula*. Although the details of the chart are not essential for a grasp of the significance of the "Tree of Knowledge," a rather detailed explanation of the formula is indispensable.

I. THE CHART

I.1 The chart is based on the Cassirer-Langer¹ view of human thought as the creation and use of symbols. The origins of this view are found in G. B. Vico, and it is shared today by philosophers, linguists,

psychologists, and anthropologists. Hence *symbolism* is the trunk of the "Tree." (Concepts of time and space always implicitly accompany thought, which the original of the chart clearly indicates though its reproduction on the cover does not.)

I.2 There are two types of symbolism, after Langer: *presentational* and *discursive*.

These are portrayed by the two main branches of the trunk. *Presentational symbolism* includes four modes of thought: *magic, myth, religion, and art*, portrayed by the four main subdivisions or "phyla" of the right branch of the trunk. *Discursive symbolism*, portrayed by the left branch of the trunk, corresponds to the fifth mode or phylum of thought appearing in the Tree: "*science*." As used here, "*science*" includes philosophy, mathematics, the physical sciences, and social science.

I.3 The five modes of thought—*magic, myth, religion, art, science*—appear on the chart in this order, from right to left, to indicate the chronological sequence of their birth. They all reach the top of the chart, directly or through ramifications, to indicate that they all are still alive, regardless of their time of birth (see II.2).

I.4 Concerning *magic, myth, and religion*, we should point out that their lack of subdivisions is due only to the fact that more

¹ Ernst Cassirer. *The Philosophy of Symbolic Forms* (2 Vols.). New Haven: Yale University Press, 1953, 1955.

Ernst Cassirer. *An Essay on Man*. New Haven: Yale University Press, 1944.

Susan Langer. *Philosophy in a New Key*. Cambridge: Harvard University Press, 1942.

detailed presentation has been judged unnecessary in a study focused primarily on the taxonomy, history, and panorama of "science." The ramifications of the fourth branch, *art*, are as many as those of the whole Tree, and comparably arranged. This is a significant confirmation of Herbert Read's view of art as the first step of each new development of human thought.²

1.5 The Tree presents "science" in a relatively detailed genealogical, taxonomical, and historical form, as well in its contemporary panorama, unlike its generic treatment by Cassirer. We distinguish three different modes of scientific thought, born at different times, based on three different conceptions of time, space, and causality, and all still alive. On the Tree they appear as the three "classes" into which the phylum "science" divides: *Euclidean World-View*; *Non-Euclidean World-View*; and *Organismic-Transactional World-View*.

1.6 The three "classes" of "science," as well as their "sub-classes," "super-orders," "orders," "families," "sub-families," "genera," "species," and "subspecies," are presented on the chart from left to right in rough order of the chronological order of their birth. In this they are unlike the five phyla of symbolism, which are ordered from right to left. This change of direction has two purposes. First, the convergence of presentational and discursive symbolism emphasizes the continuous intercourse between presentational symbolism—which is a source of incandescent bundles of new ideas—and discursive symbolism—which selects, separates, crystallizes, variously combines, and develops a few of these ideas. Second, the direction of "science" toward presentational symbolism (though it never reaches it, of course) is meant to indicate science's increasingly close grasp of the depths and complexities of reality, those depths and complexities that are the raw material of the ever-new "intuitions" of presentational symbolism.

1.7 The *Euclidean World-View*, or World of Common Sense, denotes the general outlook on things and the system of thought that stemmed from Greek geometry and philosophy. It dominated knowledge within Western civilization until the birth, around 1850, of the *Non-Euclidean World-View*, which now coexists with it. The three orders of the *Euclidean World-View* are: *Rationalist Philosophy*; *Scientific Empiricism*; and *Philosophical Empiricism*.

Rationalist Philosophy is the trend extending from Plato to the present which "regards reason as a source of synthetic knowledge of the physical world."³ Its taxonomical subdivisions resemble the partitions of Platonic and Aristotelian philosophy, and at various levels include logic, metaphysics, physics, ethics, education, economics, politics, and aesthetics.

Scientific Empiricism is the hypothetico-deductive science of the physical world, born with Galileo, which implies an absolute time, space, causality, and so forth. Its two "families" are pre-modern Physics, with its several genera, species, and sub-species, and pre-modern Chemistry.

Philosophical Empiricism, from its origins with Bacon, has divided into two "families": Epistemology and Utilitarian Ethics. The latter in turn has three "genera": ethics, with its several species, among them economics and politics; psychology, born from utilitarian ethics out of physiology; and Darwinian biology, whose principle of natural selection is derived from Malthus' *Essay on Population* and from the theory of economic competition.

1.8 The *Non-Euclidean World-View*, or the World of Uncommon Sense, indicates a general outlook on things and a scientific mode characterized by the rejection of absolutes. Non-Euclidean geometry accomplished its first phase, the rejection of absolute space—hence its name. The *Non-Euclidean World-View* "class" has two "sub-classes": *Image of Nature* and *Image of Man*.

² Herbert Read. *Icon and Idea*. Cambridge: Harvard University Press, 1955.

³ Hans Reichenbach. *The Rise of Scientific Philosophy*. Berkeley and Los Angeles: University of California Press, 1959.

I.9 The *Image of Nature* bifurcates into two "super-orders": *Continuity-Certainty* and *Discontinuity-Uncertainty*. The first is characterized by the rejection of absolutes in general (philosophy) and of absolute space and time in particular (relativity theory). The second, more revolutionary, also rejects causality (quantum theory).⁴

Among the branches of the *Continuity-Certainty* "super-order," at various taxonomical levels, are non-Euclidean geometry, non-Euclidean mathematics, symbolic logic, logical empiricism, pragmatist philosophy, and relativity theory. As an example of further taxonomical detail, pragmatist philosophy (an "order") is subdivided into such "families" as epistemology, ethics, and aesthetics. The "family" of ethics in turn divides into such "genera" as religion, ethics, education, economics, and politics.

Among the branches of the *Discontinuity-Uncertainty* super-order, at different taxonomical levels, are the modern theory of infinity, mathematics, metaphilosophy, quantum physics, and quantum biology.

I.10 The *Image of Man* is considered a "sub-class" of the Non-Euclidean World-View to indicate metaphorically its loose but not unmeaningful analogy with the rejection of absolutes that characterize the *Image of Nature* branch. More specifically, when applied to the *Image of Man* the expression "Non-Euclidean World-View" is meant to convey the idea that, as relativity theory reaches beyond the "common sense" meaning of space and time, and as quantum theory also reaches beyond the "common sense" meaning of causality, so Psychoanalysis and Gestalt Theory reach beyond the "common sense" meaning of human thought. They do so by showing that the conscious thoughts man has about himself and others are but a small part of what goes on within him, and thus perhaps also reach beyond the "common sense" concept of time, space, and causality.

The *Image of Man* "sub-class" has three "orders": *Psychoanalysis*; *Gestalt Theory*, subdivided into two "families," Gestalt and Field; and *Psychoanalysis-Gestalt-Field*. The branches of the *Psychoanalysis* "order" include psychology, subdivided into psychology proper and anthropology; logic; ethics, subdivided into religion, ethics, education, economics, and politics; and aesthetics. The branches of *Gestalt* are almost identical with these. Among the branches of the *Field* "order" are experimental social psychology and group dynamics.

The *Psychoanalysis-Gestalt-Field* "order" proved necessary to indicate the tendency of the three types of studies to overlap and to influence contemporary social science. It includes, at various levels: modern social science, subdivided into cultural anthropology and social psychology; anatomy and pathology of cultures; and traditional social science, divided into sociology, history, political science, and economics.

I.11 The *Organismic-Transactional World-View*, the third "class" of "science," expresses the outlook on things which seems destined to characterize the forthcoming phase of knowledge. The term *organismic* underlines the fact that today all sciences, including psychology, modern biology, and modern physics (quantum theory), "are beset by problems which are indicated by notions such as 'wholeness,' 'organization' and 'Gestalt.'"⁵ *Transactional* indicates the impact on biology, psychology, sociology, political science, etc., of Dewey's and Bentley's concept of "viewing physical nature and human society from the transactional as against the interactional or self-actional point of view."⁶ The expression *organismic-transactional* suggests the compatibility, analogy, and overlapping of the two approaches as well as the substantial unity of this new world-view.

In its present stage of development this world-view seems characterized more by promising, and at times parallel or over-

⁴ F. Waisman, "The Decline and Fall of Causality." In *Turning Point in Physics*. Amsterdam: North-Holland, 1959.

⁵ Ludwig von Bertalanffy. *Problems of Life*. New York: Wiley and Sons, 1952.

⁶ Sidney Ratner, "A. F. Bentley's Inquiries into the Behavioral Sciences and the Theory of Scientific Inquiry." In R. Taylor, ed. *Life, Language, Law*. Yellow Springs: Antioch Press, 1957.

lapping, new inquiries than by well established disciplines. It also tends to shun the traditional concept of disciplines as separate entities. Thus the task of organizing the Organismic-Transactional branch of the Tree has been difficult. As a result the new inquiries are grouped under relatively conventional titles, enclosed in quotes.

The branches of this "class," at various taxonomical levels, include: "*philosophy*," subdivided into philosophical anthropology, genetic epistemology, transactional philosophy, general semantics, general systems research, and cybernetics; "*mathematics*," subdivided into topology, theory of games, information theory, and operations research; "*physics-biology-psychology*," with those three subdivisions; and "*behavioral science*," subdivided into "behavioral science," "economics," and "ethics"—the last further subdivided into scientific ethics, mental hygiene, and psychosomatic medicine.

II. THE FORMULA

II.1 Taxonomy of Knowledge. The Tree of

Knowledge is primarily an attempt to create such a taxonomy. The purpose of taxonomy in general, and of the proposed taxonomy of knowledge in particular, is to develop a convenient and precise method of classifying human knowledge, and thereby preserving knowledge and making it accessible. A classification based on extended examination, description, and comparison of the various kinds of knowledge becomes in fact a short expression of a vast amount of data. According to Paul Weiss:

The grandest examples of such ordered sets of data are perhaps the Linnean system of species prior to the theory of evolution, or the Mendelyev Atomic tables prior to modern physics. In various stages of evaluation, such packaged information is then circulated, leading to confluence and critical correlation with countless contributions from other sources. From this synthetic

process, hypotheses emerge, which, upon further verification, turn into integral parts of the body of knowledge—theorems, principles, rules and laws—general formulas which not only supersede the itemized accounts of the very data from which they were derived, but can dispense with the further search for items of information, which they predictively subsume.⁷

The chart, on the cover, indicates the leading criteria upon which this taxonomy is based. We must now illustrate the implications and applications of the taxonomy.

II.2 Survival of leading intellectual trends.

The fact that all branches of the Tree reach the top of the chart suggests that *leading intellectual trends, once born, tend to survive indefinitely*.⁸ By "leading intellectual trends" we mean "*phyla*" of thought; "*classes*" of "*science*"; "*orders*" of the Euclidean World-View; "*sub-classes*," "*super-orders*" and "*orders*" of the Non-Euclidean World-View; and all the other "*orders*," "*families*," and subordinate classifications appearing in our taxonomical chart.

Obviously, the initial statement in the preceding paragraph is to be interpreted "*cum grano salis*." What "survives indefinitely"—just as magic, myth, religion, and art do—is the core of the "intellectual trend," not its superficial coating. The latter is subject to change, of course. Frequently the old core is not easily discernible in contemporary works, because of a heavy modern coating with which it is covered, or because it is blended with other trends.

II.3 Suggestions for the Sociology of Knowledge.

Why do the leading intellectual trends, once born, tend to survive indefinitely? How? These problems, raised and focused by the Tree of Knowledge, deserve attentive consideration by the sociologists. With a few exceptions, e.g., Karl Mannheim, they have almost completely neglected them.

⁷ Paul Weiss, "Knowledge: A Growth Process." *Science*, June 10, 1960.

⁸ Several philosophers have told the author that they are in substantial agreement with this point of view, which also seems to be shared by Bertrand Russell (*Wisdom of the West*, New York: 1959, p. 120). The point has not been sufficiently exploited thus far.

II.4 *Different age of contemporary intellectual trends.* Since leading intellectual trends, once born, tend to survive indefinitely, we may infer that *the different intellectual trends which coexist today are often variously old, from the point of view of the unfolding of knowledge, irrespective of the date of their latest representative works.* For instance, a philosophical treatise in the idealist, Neo-Thomist, Empiricist, or Pragmatist tradition, written today, is in a sense as old as, respectively, the works of Plato, Thomas Aquinas, Locke, or Dewey. Analogously, an economic treatise in the Aristotelian, Laissez Faire, Marxist, or Keynesian tradition is in a sense as old as, respectively, the works of Aristotle, Ricardo, Marx, or Keynes. (The age statement does not imply a value judgment.)

II.5 *Conventional disciplines as mosaics of different strains of thought.* The tendency of leading intellectual trends to survive indefinitely, and the fact that the different intellectual trends that coexist today are variously old, jointly lead to the inference that *what is generally called a "discipline" is often in fact a mosaic of variously old, often radically different (especially in fundamental assumptions) strains of thought, which have little in common beyond a supposedly analogous subject-matter and a name.* This is apparent in the Tree: the various "disciplines" appear in it repeatedly, i.e., in correspondence with the various intellectual trends from which their different strains have stemmed. For example, Ethics and Economics appear in the *Rationalist Philosophy* branch (I.7) in the *Philosophical Empiricism* branch (as subdivisions of Utilitarian Ethics, I.7), under *Pragmatism* (I.9), under *Psychoanalysis* (I.10), and so forth. Hence, our taxonomy of knowledge might be called *pluralistic taxonomy*.

This suggests, in turn, that attributing the same collective name (e.g., philosophy, ethics, economics) to the various strains of any discipline without careful qualifications is a semantic error, which fosters intellectual confusion. Thus the Tree implicitly advo-

cates the creation and development of a *semantics of knowledge*. The taxonomical structure of the Tree contributes some foundations to such a discipline which would probably be analogous to the "philosophy of ordinary language."⁹

II.6 *The history of disciplines and the history of ideas.* The concept of conventional "disciplines" as mosaics of different strains of thought; the fact that the various "disciplines" appear repeatedly in the Tree (i.e., within different intellectual trends); the urgent need for a semantics of knowledge; and the Tree's unified portrayal of the various trends of knowledge—all these factors clearly suggest, as a corollary, *a new approach to the history of the ideas in general, and of any discipline or combination of disciplines in particular.* In terms of this approach the history of any idea or of any discipline should be "taxonomically conscious," i.e., it should make constant reference to the fundamental trends of knowledge that have appeared in history, and it should emphasize the "intellectual trend" from which each idea stems or to which each strain of a given discipline belongs. To some extent this approach would *unify the history of all disciplines* and would make history simpler, clearer, less arbitrary, and easier to remember.

The new approach to the history of ideas also, of course, applies to the history of the Philosophy of History. The Tree explains why history is continuously being, and always will be, rewritten, independent of the discovery of new historical data. This is so because new "intellectual trends" arise continuously; they entail ever new points of view on past events, while the old points of view survive indefinitely.

The fact that leading intellectual trends tend to survive indefinitely, and that the leading intellectual trends coexisting today are variously old, implies that in a sense the history of knowledge and the panorama of knowledge coincide at any given time. This in turn implies that a panorama of contemporary knowledge must be at the same

⁹ See Albert William Levi, *Philosophy and the Modern World*, Bloomington: Indiana University Press, 1959, Chapter XI.

time a history of knowledge. This point of view can be doubted only if one confuses *contemporary knowledge*—which includes all the intellectual trends of the past, none of which is dead—with that slice of contemporary knowledge represented by *intellectual trends born recently*.

II.7 *In criticism of Comte and of current inquiries as to the "unity of knowledge."* In light of the foregoing argument, there are at least two reasons why Comte's classification of the sciences is unsatisfactory, and also why current inquiries as to the "unity of knowledge" have advanced but little. First, both Comte's classification and those inquiries are based on a historically vague concept of "knowledge," which confuses "*contemporary knowledge*" with the *intellectual trends born recently*. Secondly, both consider the various "disciplines" as if they were monoliths rather than mosaics, and as if only their most recent strain were important.

II.8 *Solutions to problems of knowledge.*

There is much current discussion of the often ill-defined problems of the "unity of knowledge," "integration of knowledge," and "panorama of knowledge." The Taxonomy of Knowledge presented by the Tree offers a definition of these problems and a proposal for their solution. Specifically: (a) the Tree implies and illustrates a conception of knowledge as a whole; (b) its structure and ramifications—which point out influences, derivations, combinations, relationships, affinities, and analogies—portray the *integration of knowledge*; and (c) as already indicated, the top of the Tree is a *panorama of contemporary knowledge*. This panorama is *all-inclusive*, although taxonomically it does not go beyond the level of "subspecies," and can be visualized at a glance.

Further, the panorama of contemporary knowledge offered by the Tree is *pluralistic*—i.e., the Tree limits itself to recording and classifying the coexisting trends and strains of thought, without implying rejection or approval of any of them. It doing so it

stimulates comparisons among them, thus fostering the "free market of ideas."

II.9 *The Tree and General Systems Research.* "Integration of knowledge"

(II.8), without further specification, is a vague expression. The Tree makes it more concrete, by outlining two types of integration: *vertical*, displayed by its branches and ramifications rising from bottom to top; and *horizontal*, suggested by several parallel ramifications stemming from the same branch. This contribution seems to fall broadly within the scope of General Systems Research.¹⁰

II.10 *The Tree and Education.* One educational value of the Tree is the organic and historical approach to knowledge that it predicates. This has been recently stressed by Paul Weiss:

Scientific knowledge grows as an organic tree, not as a compilation of collector's items. Facts, observations, discoveries, are but the nutrients on which the tree of knowledge feeds, and not until they have been thoroughly absorbed and assimilated, have they truly enlarged the body of knowledge. . . . In knowledge, as in nature, fruits grow on trees and cannot be raised directly on the soil by short cuts bypassing the tree. . . . We must be far more explicit than we have been lately in teaching . . . not just the present state of knowledge, but the way in which it has grown up to there, which is the only way in which it can grow further.¹¹

Another value of the Tree to education is that, owing to its taxonomical organization, it offers the first demonstration of the difference in hierarchical rank—and therefore in importance—which characterizes the various fields and branches of knowledge. Such a demonstration is vital today, when the problem of educational curricula is so sharply debated. To quote Paul Weiss again: "To hoard a store of unrelated items in a mental gullet by rote memory and without

¹⁰ *Yearbook of the Society for General Systems Research* (Vols. I-IV). Ann Arbor: University of Michigan Mental Health Research Institute, 1956-1959.

¹¹ Weiss, *op. cit.*

sense of relevance should pass for knowledge no more than the stuffing of a hamster's pouch can be regarded as growth." He adds:

How could the uninitiated self orient purposefully if we hide or blur the goal? Or do we expect each self to rediscover the goal for himself by trial-and-error, fumbling and floundering in semidarkness, when we could readily draw on the lesson of the past to illuminate both goal and path? . . . So, *let us restore to education some fundamentalism—making explicit to the student the fundamental bearings needed for him to chart his course in clear view of what furthers knowledge and what does not, instead of letting him drift in the cross currents of traditional movements and alluring fashions.* . . .¹²

In particular, the Tree implies that, *ceteris paribus*, the higher a discipline is taxonomically situated, the less important it is from the point of view of true education; and that, in general, the disciplines situated at a lower level in any branch are indispensable for a true acquaintance with those located at a higher level.

Here we might mention that if the name of its founder were added on each branch and ramification of the Tree of Knowledge, we would have a taxonomical *Tree of the Protagonists of Human Knowledge*.

Yet another educational value of the Tree would be its use as a *guide for planning or revising curricula of general and specialized*

education. Since it points out the different hierarchical rank and importance of the various disciplines, the Tree as a whole indicates the essential components of any curriculum of *general education* which aims to be complete and satisfactory. Analogously, it outlines the indispensable background of any specialized field, or what has been called "general education for the specialist." And both the Tree and its leading branches further the search for gaps and mistakes in existing curricula.

II.11 *New knowledge and new creativity.*

"No man of learning can possibly encompass the whole of human knowledge. He can, and should, however, know what is essentially affirmed by each field of knowledge. The sum of these facts places for him in the best possible perspective the results of all scholarly work and, most of all, the results of his own proper research."¹³ The Tree, by outlining a *new type of knowledge* different from both unorganized general education and shallow specialization, proves the above statement and translates it into a living reality. It is, in other words, a guide and a stimulus for anyone who cares to enrich his study, research, teaching, interest, or activity, by relating it to its neighboring fields, to its roots, or to the whole framework of human knowledge. By offering an easy reference to any field of knowledge, the Tree stimulates curiosity and fosters broader insights, greater creativity, more imaginative research in any field—and a more satisfactory living.

¹² *Ibid.*

¹³ *Diogenes*, #22 (Summer, 1958), inside cover.

*NOTE: Copies of the Tree of Knowledge chart (45" x 28") may be obtained for \$1.50 by writing the author, % New School for Social Research, 66 W. 12th St., New York, N.Y.

"Science in isolation cannot suffice: it needs moral force to direct it.

"The discovery of scientific truth is a goal in itself, but it is also a means to an exalted end: the advancement of man and society, the dominion of man over nature for the sake of his spiritual and moral elevation and the economic and social well-being of each people and the entire human race."

DAVID BEN-GURION

The Sociology of Adjudication

Who Defines Mental Deficiency?

by LEWIS A. DEXTER

Clinical psychologists, counsellors, and other professional people regularly pass judgment on others in the course of their day-to-day work, and generally they must do so on a hit-and-run, common sense basis. Lewis Dexter cites some cases of such adjudication affecting mental defectives, especially those who have been brought to the attention of the courts, and implies that revisions of practice are in order. The author has published a series of articles in the field of mental deficiency research under the auspices of the K. J. Anthony Trust (% Depositor's Trust Co.) of Lewiston, Maine.

In terms of generally accepted notions of civil liberties and due process of law, there are several unfortunate aspects of informal adjudication. Take the following not-so-hypothetical case:

Some years ago a child was brought before a juvenile court for having broken a number of windows. The court sought a physician's opinion on the child. In his judgment the child was defective, and because of his statement the child was committed to a State institution for defectives. A few years later the institution acquired a new superintendent and the child, now a young man, was found to be normal enough to go to college. Subsequently, in fact, he received a bachelor's degree and entered one of the professions.

For several years I have been trying to gain a better understanding of some of the processes of adjudication engaged in by clinical psychologists, physicians, counselors, teachers, and others, with only partial success. There is evidence of practices that at least appear to contradict some of society's values. Yet it is difficult to place blame. The practical situation ordinarily makes it necessary for practitioners to adjudicate on a hit-and-run common sense basis, because they must necessarily focus their attention upon an immediate need as defined by external circumstances or manifest problems. Perhaps analysis of the processes of adjudication may suggest some revisions of practices that will permit a better realization of values and a reconciliation of conflicting purposes.

THE NATURE OF ADJUDICATION

Adjudication is an important element in any theory of social control. As R. T. La-Piere points out, social control may be regarded as "the third dimension of behavior," the "something" that operates in every society "to correct for the inevitable errors of socialization, to make the deviant individual conform rather closely to the dictates of his social heritage."¹

By adjudication we mean the application of general principles to concrete instances by recognized authorities, with the purpose and probable result of determining what shall happen to specified persons, property, or institutions. Generally speaking, adjudication ultimately results in a certain value being awarded or denied an individual, or in a penalty being imposed or not being imposed on him. And, again speaking generally, any particular decision by an adjudicator is justified, or is thought to be justifiable in principle, in terms of a pattern of equity or social ethics that the adjudicator holds in his role as representative of the society or group.

This type of definition can be applied without difficulty to a large part of legal practice. But when a more general and workable definition is needed, two kinds of issues time and again become apparent. First, informal practices that resemble adjudication take place in all sorts of rela-

¹ In his *Theory of Social Control*, London: McGraw-Hill, 1954, Chapter II.

tionships in our society. Consensus "operates" in many work groups, neighborhoods, and families to decide that somebody is or is not entitled to something, has been mistreated, should be ostracized, and so forth. But how does consensus "operate"? And when it does not "operate," how do people resolve disagreements, quarrels, and differences about significant values? There is little systematic knowledge of such matters, especially as regards the nature of social control, though studies could easily be made of such groups as university faculties or student bodies.

The second question is almost as difficult. How do we explain the fact that results of adjudication in comparable situations are so varied that they look as though they were determined sheerly by chance? Even within conventional branches of criminal law the severity or leniency of a sentence seems to be largely a function of the particular judge's preferences, rather than of readily apparent, generally accepted standards. Here at least the initial determination of fact and guilt or innocence is subject to rules that can be formulated. Adjudication concerning mental defectives, however, does not have even these guideposts.

COURT ADJUDICATION OF MENTAL DEFECTIVES

A mentally defective person may be *referred* to the attention of authorities on any one of a number of grounds. Once referred, he is "subject to be handled" in most jurisdictions without regard to the proof or disproof of the original allegation. He has become a nuisance *because he was referred*, and so he may be subject to special treatment or institutionalized without anyone bothering even to go through the motions of finding out whether the initial allegations were true, or even plausible.

A fairly small number of mental defectives are referred to authority for action on the ground that they are supposed to be mental defectives and for no other reason. Most high-grade defectives are not institutionalized, and many of them are not sent to

special classes or schools. Quite literally, there are no criteria by which one can justify the fact that in a given jurisdiction such-and-such defectives are institutionalized and comparable cases are not. The only possible justification would be to say: "It is much the same as with prison. Those who commit crimes cleverly are less likely to get caught. Mental defectives who are simply defective and are reasonably amiable and 'good,' or at least not irritating, are less likely to be referred and, if referred, are less likely to be institutionalized." On the average this is no doubt true, but it is hard to formalize the vague theory of social control which may underlie such a viewpoint.

In many if not most instances, the adjudication that actually takes place is informal and follows no legal pattern. When a case comes to court a judge sometimes may attempt to apply some legal standard, but frequently he is guided by a psychologist, a social worker, a doctor, or the alleged defective's own family. The executive secretary of a State Association for Retarded Children has argued that judges are more arbitrary than doctors or psychologists. This suggests another point for analysis. There is a distinction between those occasions when judges act as lay psychologists, in which case many of them are probably more arbitrary than psychologists or even physicians, and those occasions when a judge is guided by legal traditions and rules that may lend an element of comparability and standardization.

Adjudication sometimes may be performed by the alleged defective's own family, for example, when the family reports the person in such a way that he becomes "subject to be handled." But this is inadequate justification for the decision, since there is no evidence that all persons with the mental capacity or lack of capacity imputed to the person in question are unable to get along well enough. Despite popular mythology to the contrary, mental defect by itself does not seem to be a serious handicap to social adjustment.²

² See S. Perry, "Some Theoretic Problems of Mental Deficiency and their Action Implications," *Psychiatry*, XVII (1954), pp. 45-73.

A specific example of informal adjudication occurred in a jurisdiction which had a reputation of being particularly progressive in matters psychiatric. A boy accused of stealing was brought before a court, which in turn referred him to psychologists. These men, according to my informant, thought him a "fairly decent kid" and hence gave him four or five intelligence tests until they found one on which he scored below the cutting point for deficiency in the jurisdiction. This "result" made it possible for the boy to be sent to an institution for defective delinquents rather than to jail—though this probably was a disservice because the sentence to the institution was intermediate and might have been for life.

In another instance, according to some psychologists involved, a large corporation wanted action taken against local adolescents who played on its grounds. The municipal court treated the offenders leniently, however. It then occurred to someone in the corporation that habitual trespassers might be "defectives." Intelligence tests were given them and some of them scored poorly enough that they were sent to a State institution (from which, according to plausible report, it is somewhat difficult for unbefriended high-grade defectives to be released; they are indispensable for the adequate, economical operation of the institutional plant). In this instance, the psychologists handled the tests routinely and according to technical standards. They gave the impression that they may not continue to do so if the court further violates their notions of equity; in other words, they will take over functions of adjudication themselves. (The incident is fairly recent but probably is not now repeated in the jurisdiction in question.)

WHO SHALL JUDGE?

Very frequently, adjudication with far-reaching results for mental defectives takes place without any court appearance or action at all. Parents, siblings, guardians, sometimes teachers, decide an adolescent or child "ought" or "ought not" to be sent away. Particularly if families are fairly well off, no resort to the courts is necessary to imple-

ment the decision. Yet it *is* adjudication, and of much greater consequence than many court decisions. So far as I know, there has been no systematic capture-and-record study of the decision to institutionalize high-grade defectives in well-to-do families. While low-grade defectives are proportionally more common in well-to-do families than in poor ones, nevertheless there apparently are enough high-grade defectives in well-to-do families to make the study feasible. Harold Mendelsohn and the writer have prepared an extensive proposal for such a study, which could be of great value both to students of mental deficiency and to analysts of social control.

Whether within or outside of court, it would be profitable to try to determine whether what appears to be adjudication is in fact merely *ratification*. That is to say, it may frequently be that an individual has been so shame-provoking or irritating to his family or neighborhood that they want to get rid of him and simply follow the most accessible process, by going to court or consulting a psychologist.

On the other hand, it often seems to be the case that professional diagnosis is adjudication in and of itself, though not necessarily with awareness. Wise or experienced psychiatrists, psychologists, and teachers may no doubt realize that they are adjudicating, but some proportion of professional diagnosis is performed by persons whose professional skill is greater than their wisdom. It would be of interest to know the degrees to which school psychologists or guidance counsellors regard themselves as engaged in adjudication, or as representing some mechanism of social control. With psychologists one might expect to find some resistance to the idea, for in psychological training there is a good deal of emphasis on "hard facts," that is, those facts that are defined as relevant by common sense, professional tradition, and the problems *as originally conceived*. The present problem of judging defectives is beyond psychology, if not beyond wise psychologists. It is both contributory to and reflective of the larger problems of setting and applying standards for individual lives.

Topics and Critiques

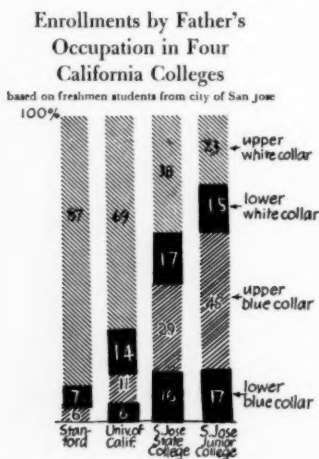
INTERGROUP RELATIONS

On August 9th and 10th, a conference on intergroup relations met in Frankfurt at Wolfgang Goethe University's Institut fuer Sozialforschung. It consisted largely of American and German behavioral scientists under the chairmanship of Otto Klineberg of Columbia University. The rash of anti-Semitic incidents in Germany and America in Winter, 1959-60, were subjects of several studies reported by members of the group, who agreed that the incidents were not the product of coordinated, conspiratorial action. The discussion raised a question of major importance to group relations: inasmuch as aggressive behavior against minorities needs little basis in minority behavior or in minority-majority relations, are not the remedy for and prevention of such activity to be found essentially in the surveillance and control of politico-social structures and general attitudes (Pareto's *residues* and Sumner's *mores*)? That is, perhaps the structure of decision-making in a society plus fundamental sentiments of "humanity" determine the state of social harmony.

"MAN IN SPACE"

The social problems of the missile and space age formed the subject of a conference at the Brookings Institution in June. Little work is now being done on the kind of social futurism that was outlined by H. D. Lasswell in his presidential address to the American Political Science Association in 1956. The National Aeronautics and Space Administration has an interest, with Jack Oppenheimer in charge; the Brookings Institution, with Don Michaels, is cooperating. Joseph Goldsen of RAND (see p. 29) is working on political implications; so is Lincoln Bloomfield at MIT. Several pieces have been written on the legal problems of outer and inner space (e.g., see *PROD*, III, December 1959). Bio-Astronautics and Space Psychology are flourishing little fields. From the proceedings of the Conference, to be related later by Michaels, it would appear that the space-technologists are divided among Buck Rogers and Doubting Thomas types. Clear as it may be that policy should determine invention and development in this vast area, it is equally clear that the technical work is moving rapidly without systematic political controls.

LIMITATIONS OF "COLLEGE-FOR-ALL" SLOGANS



Burton Clark's book, *The Open Door College* (N.Y.: McGraw-Hill), contains this bar chart, which interests us because it shows how close America is to giving college opportunities to all who want them, and because it shows how strongly voluntary college applications are linked with the white-collar population. San Jose Junior College is required to accept any high school graduate who applies for admission. On English and mathematics achievement tests, students entering San Jose JC in 1955 performed at a level equal to the first two years of high school. Educators must either whip up the collegiate ambitions of bright students of blue-collar families or accept a degraded (and degrading) college system. (They might also resist more college opportunities for unequipped students!?)

A SYMPOSIUM ON NATIONAL GOALS

With approximately half a million dollars from private foundations to support its work, begun this Spring, the President's Commission on National Goals expects to turn out in December about fifteen articles on American problem-areas together with an over-all report and dissents. According to the *New York Times* of July 17th: "The Commission was not ready to disclose the names of these specialists, wishing to shield them from public pressures. They include university professors and newspapermen." William P. Bundy, Staff Director, was quoted to say: "This will be a document that looks to the next decade" and also, "We're shooting at a document that anyone who buys quality paperbacks would buy." It will be commercially published and sell at one dollar a copy in paperback. It will probably be the most expensive symposium ever published. If only the Commission had gone to Professor Joseph Roucek with their problem!

POLLING AND POLITICS

Ominous rumblings have accompanied some recent opinion polling ventures, suggesting that the political campaign season is bringing its usual ethical problems. In May Elmo Roper and Lou Harris tangled at the AAPOR convention in Atlantic City over the latter's heavy commitment as both advisor and pollster for the Kennedy campaign. Late in July a Nixon campaign leader in California instructed Nixon volunteers to telephone Democrats, representing themselves only as agents of Facts Consolidated, a polling organization, and ask the respondent's presidential choice. "Undecideds" later were to be subject to intensive proselytizing efforts. The State Democratic national committeeman attacked the plan as "a deceptive and flagrant abuse" of polling, and Facts Consolidated subsequently washed its hands of the affair as a misunderstanding. This has been done before many times, in a dozen different ways, by both parties. Democratic Senator Albert Gore was reported in the August 21st *New York Times* to say that public opinion polls have an "entirely unjustified" influence on elections, are "almost meaningless and in many instances misleading," and are an "appropriate area" for study by the Senate Privileges and Elections Subcommittee. (The Gallup Poll had just announced the Nixon-Kennedy opinion split as 50%-44%.) The pollsters' reactions diverged. George Gallup denied that the polls had unjustified influence and said that there was evidence to the contrary. Elmo Roper, on the other hand, agreed there were pitfalls because "there can be a lot of misuse of the polls themselves." He disparaged their use prior to conventions, though not afterwards, and said it would be "probably a good idea" if the Senate investigated polls. We agree, if only on grounds that increased political familiarity with applied social science may reduce some of the hostility toward it.

ABS APPEALS FOR AUDIENCE PARTICIPATION

Apropos the changes in this journal, Carl Stover's note probably speaks for sundry readers: "Congratulations on the new look for *PROD. The American Behavioral Scientist* is a much more distinguished title. However, now that the thing has become successful, I hope it will not deteriorate like so many other successful ventures." We shall try to become better without at the same time getting worse, and hope for readers' notes and comments *ad libitum*.

CLYDE KLUCKHOHN

The death of Clyde Kluckhohn, member of our Advisory Board, causes us grief. One of the world's most distinguished anthropologists, Clyde was forever pulling into his own field the theories and methods of philosophy, sociology, and psychology. The midwestern boy grew into a manhood of great breadth and sophistication; responsive, charitable, keen, and ready to go. One of these days, when it can no longer be called an obituary, we shall publish an analysis of his wonderfully synthetic approach to the study of man.

Highlights of the Senate Report on Information Indexing and Retrieval¹

AN ABS STAFF REPORT

Bibliographic frustration is an increasingly common ailment among social scientists. The root of the affliction is a far-flung abundance of materials on a given subject, its major symptom a persistent uneasiness that some significant material has been overlooked. The physical sciences have felt the full brunt of the problem; it is conservatively estimated that 1,250,000 original technical papers will be published throughout the world in 1960. One major approach to the problem has been the development of mechanized systems of information and processing and retrieval, by both private and governmental organizations. The U.S. Senate Committee on Government Operations has recently prepared a comprehensive report on the present status of such systems. We present here some of the significant findings of that report,² with an injunction for behavioral scientists: "Go thou and do likewise."

ON THE NEED

"Rapid and effective large-scale systems for organizing and searching the information content of scientific publications are essential if scientists are to be able to locate needed information without spending a large proportion of their valuable time on laborious searching through the literature. These systems should incorporate mechanized procedures wherever mechanization promises to increase their speed or the accuracy and detail with which information can be retrieved. The design of these improved systems and the development of procedures for using high-speed machines in the processing of scientific information require thorough study of the actual information requirements and practices of scientists, research on and experimentation with possible ways of organizing and searching information so as to best meet their requirements, and finally, testing and evaluation of proposed new procedures and systems."

In the Federal Government

In a survey of federal operations in this

area: "Representatives of all agencies generally agreed that there was an urgent need for the development of improved systems of engineering and for the installation of mechanical electronic retrieval equipment adaptable to specific programs, in order to make certain that all available scientific information would be readily accessible to Government agencies and to members of the scientific community. As will be set forth in this report, many Federal agencies—particularly the AEC, CIA, ASTIA, Patent Office, and the National Library of Medicine, are making rapid progress in evaluating and developing such mechanized systems."

"In the view of the staff, however, other agencies are not placing proper emphasis on the importance of expediting the improvement of existing programs." (p. 7)

In Industry

"A recent survey on the value and importance of information retrieval, conducted by the International Business Machines Corp., reveals also that much valuable time

¹ U.S. Senate Committee on Government Operations, 86th Congress, 2nd Session. *Documentation, Indexing, and Retrieval of Scientific Information*. Washington, D.C.: USGPO, May 24, 1960. This report was re-released as Senate Document No. 113, subtitled *A Study of Federal and Non-Federal Science Information Processing and Retrieval Programs*, on June 28, 1960, and is for sale in this form by the Superintendent of Documents for \$7.00.

² Some quotations in this article are from studies and statements cited at length in the Senate report. When quotations are not those of the Committee staff itself, the organizational or individual source is indicated following the quote. Page numbers in all cases refer to the location of the material in the Senate report.

and large sums of money may be saved by the utilization of proper systems for automatic data processing and information retrieval. . . .

"Once the need for information arises, the requestor's productivity drops until the information is obtained. . . . The typical researcher slows down, tries to find alternate ways of solving his problems, or seeks alternate sources of information, usually by the consultation process. According to the survey, efficiency during waiting time drops 25 percent and costs a private industrial organization approximately \$2.50 an hour. . . .

"The survey concluded that library retrievals can reduce the use of high-cost information sources only if the quality of retrievals is appreciably improved. False retrievals are a major problem in hand systems and more complex indexing of the kind that machines can handle should reduce their number. Eliminating false retrievals would salvage the delay time users waste in waiting for what they hope will be a valuable source of information. More important would be the increased confidence in the reliability of the library that would develop from a reduction in false retrievals.

"In this connection the survey points out:

Mechanization can presumably also reduce the waste that results from not finding information that actually is in the store. Several years ago, a persistent search of our Library turned up 193 references to crack propagation in metals although at the time not a single card in our index provided a direct lead to any of these documents. Both the elimination of false retrievals and the finding of obscure bits of information require highly sophisticated indexes which are best manipulated by machine." (pp. 92-93)

ON SOME PIONEERING WORK

The Senate report outlines in varying detail the indexing and retrieval programs of eight federal agencies: the Armed Services Technical Information Agency (ASTIA), the AEC, the Smithsonian Institution's Bio-Sci-

ences Information Exchange, the CIA, the National Bureau of Standards, the Library of Congress, the NSF, and the Department of Agriculture Library. It reports more briefly on the science information and retrieval systems programs of 19 nongovernmental groups, e.g., Bell Telephone Labs, du Pont, McGraw-Hill, and Stanford Research Institute. (Almost all these reports consist of statements submitted by the organizations concerned.) Statements from IBM and the CIA suggest present technical developments and their applications.

The State of the Art: Information Retrieval at IBM

"The Information Retrieval Department of the Data Processing Division is presently marketing its standard data processing equipment—the IBM 101 electronic statistical sorter, the IBM Collator, the IBM 305 RAMAC, the IBM 650, the IBM 1401, and the IBM 700-7000 series of equipment. Every level of equipment from the simple sorter to the largest scientific computer has been implemented by IBM users in searching their files for information.

"Users of this equipment are usually concerned with three categories of information: document reference information, chemical compound information, and historical and/or real-time data.

"The search of document reference information encompasses such printed matter as technical reports, Government publications, technical journal articles, and scientific papers. Only information leading to it or possibly an abstract of it is stored. Punched cards, magnetic tape and magnetic disks serve as the storage media which are searched by the data processing equipment. . . .

"Search of historical and/or real-time data gives rise to selecting information from tape or disk files and arranging selected information in special report form. These data usually take the form of measured, observed or operational data and this kind of search plus the added features of report generation usually requires the capabilities of large-scale computers with random-access memories. . . .

"The Advanced Systems Development Division is responsible for the exploration of frontiers of Information Retrieval applications which appear to be beyond the scope of mechanization with currently available products. One item of concern involves the concept of an index machine with a very large capacity memory to make it possible to contain a complete file of index records so that they can be mechanically searched to ascertain responses to particular inquiries. . . .

"The division is also concerned with a further study in regard to the definition of problem areas in information retrieval. This study should have an important impact on the way analysts, scientists, and other research workers make known their inquiries and receive pertinent information in regard to their own particular fields. . . ." (IBM; pp. 220-21)

A Working System: CIA's Science Information Processing

"The cycle of organizational activity for intelligence purposes extends from the collection of selected information to its direct use in reports prepared for policymakers. Between these beginning and end activities there lie a number of functions which can be grouped under the term information processing. These functions include the identification, recording, organization, storage, recall, conversion into more useful forms, synthesis, and dissemination of the intellectual content of the information collected. . . .

"To cope with its information handling problems, the Central Intelligence Agency has over the past 13 years developed an information processing center which comprehensively indexes and stores that information which is collected and, as a service of common concern, renders daily support to analysts at work in all parts of the U.S. Government's intelligence community. This central reference service organizationally consists of a central library of books and documents, specialized libraries or "registers" concerned with biographic, graphic and industrial information, a document center to

which and from which the very extensive documentary flow comes, and a machine unit which acts as a nucleus supporting the office through controlled manipulation of data by machine methods.

"Efficient and economical storage and retrieval of information is by all odds the toughest of the information processing problems. . . . For us this problem is particularly vexing since our document center alone receives thousands of different intelligence documents each week in numbers of copies running into the tens of thousands. This is exclusive of newspapers, press summaries, books, maps, and other such open material which is acquired by the library in an average of 200,000 pieces per month. The open literature is obtained to meet the needs of our analysts or those of 20 other U.S. Government agencies; that which is filed centrally in our library is handled as it would be in a conventional library. . . .

"The classified documents are received from scores of different major sources, the daily volume fluctuates and lacks uniformity in format, in reproduction media, in length and quality of presentation, and in security classification. As they come in they must be read with an eye to identifying material of interest to the many different customer receipt points; those which have future retrieval value (approximately 50 percent) must be indexed and stored in such manner as to provide retrieval pertinent to customers. This material is subject to control through IBM-punched cards.

"These IBM card files now contain over 40 million cards. Since 1954 we have been miniaturizing the documents by punched cards. Access to the document itself is indirect, through codes punched into the cards to indicate subject, area, source, security classification, date and number of each document. The data on cards retrieved in response to a particular request is reproduced by photographic means in tape form and this constitutes the bibliography given the customer. This system, which we instituted in 1947 . . . , we call the Intellofax system; it represents pioneer work in the field of information storage and retrieval. . . .

"Foreign scientific information is a part of our total volume acquisitions and is important to us in the discharge of some of CIA's direct responsibilities to the National Security Council. . . . The problem we have concerning scientific information is four-fold: (1) knowing which scientific publications we need and which are available; (2) acquiring these as promptly as possible; (3) disseminating them or the information in them in a form and in a language facilitating their use; (4) organizing the information in such manner as to permit its rapid recall when needed. . . .

"We are often asked whether we make these publications available to the public. The answer is that we do. . . . Of the total publications we purchase or secure abroad, 98 percent is made available to the public through our cooperative arrangements with the national libraries. . . .

"To meet our internal needs, we require considerable translation work. Soviet publication in the field of science and technology has been estimated in excess of 700 million words per year. Presently, only a small portion of this volume—some 7 percent—is being translated. . . . This naturally led us to the possibilities of machine translation, and since 1952 CIA has been promoting machine translation research." (CIA; pp. 62-65)

ON LIMITATIONS

Mechanized documentation and information retrieval are not universal panaceas to the problems of modern knowledge. One present drawback is the state of the art. There is also the possibility that too much reliance may be placed on a single information center. According to the Bio-Sciences Information Exchange (BSIE) of the Smithsonian Institution:

"The BSIE was not designed as a 'documentation center.' The services it performs in this field are a byproduct of its primary objective of preventing unknowing duplication of research awards among the agencies that support it. . . .

"The existence of a kind of central information facility such as BSIE does not, it

THE SOVIET "I.R."

On river-front Bereshovsky Boulevard in Moscow an imposing seven-story building houses the headquarters of an organization more powerful, disciplined, and far-reaching than the most elaborate espionage system conceivable.

Title of the organization is given as the simple initials, "I.R." Strangely enough, these stand for the words in English, not Russian: "Information Retrieval."

The function of I.R. is to gather quickly and collate properly every item of scientific or technological importance published everywhere around the globe, in whatever language the item may be printed. Speedily translated into Russian, all such material—in such varied fields as chemistry, physics, agriculture, metallurgy, medicine, and, of course, military and nuclear research—is made immediately available to that most favored class of Soviet society: its research-scientists.

The hugeness of the task may be realized when the I.R. itself computes that the annual world output of scientific writing to which it has access includes 60,000 books, 100,000 research treatises, 55,000 magazines, and about 1,200,000 individual articles. Besides, I.R. endeavors to obtain the written description of newly patented inventions, and keeps a watchful eye for casual mention in general newspaper columns of any research in process or soon to be begun. . . . Between 2,500 and 3,000 highly trained persons are employed at the I.R. building. . . .

OSCAR F. GAVRILOVICH
New York Herald Tribune
News Service
April, 1960

seems to us, imply that all users of the service should cease similar or related operations of their own. Regardless of the effectiveness of the central facility, it may in some cases be in the best interests of good research management for individual agencies to continue to maintain internal records of their own agency research projects, provided this activity does not unnecessarily increase or duplicate the workload of reporting to the central facility." (p. 13)

The most important limitation of the mechanized handling of information, however, is simply that too much emphasis may be placed on it at the expense of the communication process as a whole.

"Communication involves a number of functions, storage and retrieval being just two of these. It is perhaps unfortunate that those concerned with problems of information storage and retrieval have frequently neglected other aspects of the communication process. It may well be the underlying reason for failure of many of the storage and retrieval systems which have been designed. Communication begins in the mind of man and becomes a tangible form when first spoken or written. At this point the formal communication process starts operating. In its simplest form, information is relayed from its source directly to a recipient for fruitful application. In a large community of scientists, this direct contact is not possible and consequently an elaborate system of communication devices and filters have been developed as an alternative to direct contact.

"Although these devices have been useful in certain respects, they have also presented new problems in communication. Attempts have been made to cope with the mass of information by preparing abstracts, indexes, classifications, bibliographies and other filtering devices. In the process, meaning has been lost or distorted. In many instances the use of such devices requires a specialized knowledge of their structure and limitations which is held only by those who have designed them. As in the case of primary publications, the number of secondary publications (information filters) has become so great that it is not possible for scientists to

keep pace with even that information which has been filtered. . . .

"Certainly we must not expect that we can assign to machines intellectual problems which the human mind has been unable to solve. Nor can we hope to change overnight the habits of scientists and engineers in their intellectual quest for information by simply designing a sophisticated maze of circuitry and equipment for information retrieval. And even if such machines can be designed, there are many who are concerned with the effect they may have on scientific procedure as we have known it during the past century. This procedure has resulted in significant progress to date, and new techniques for gaining knowledge may adversely affect our proven scientific methods." (Bell Telephone Labs; pp. 156-58)

ON THE FUTURE

Whatever limitations mechanized documentation and IT may have, and whatever second thoughts they may provoke, the wealth of information in the Senate report leaves little doubt that they will be very real and influential factors in scientific work in decades to come.

Research for Tomorrow

Current research and development is shaping the future of mechanized information processing. Some of these projects have clear implications for social science.

The AVCO Corporation is developing "an experimental high-density direct-access photo-storage and retrieval system for library materials. The system would include a camera to make microimages of original material, direct access photomemory mechanisms for selecting stored information and reproducing the content, and storage facilities for supplying information in electronic or optical form to a number of users." (pp. 140-41)

"The Human Relations Area Files is exploring the possibility of a design for data-handling equipment which is adapted to the needs of dealing with the material contained in its library of sources on virtually every area of human behavior. . . . Machine pro-

grams will be devised to facilitate comparative statistical research with large masses of data." (p. 141)

"The Itek Corp. is continuing their development of equipment and hardware system designs for the handling of documentary information as well as the study of industry and government applications requiring the handling of graphic information." (p. 141)

IBM "is conducting basic research in information retrieval and document analysis, directed toward the design of systems for automatic encoding, indexing, and abstracting of machine-readable documents." (p. 141)

A Nationwide Network for the Flow of Scientific and Technological Information

The full potentials of mechanized documentation, indexing, and retrieval of scientific information will not be realized until all systems are somehow coordinated. This is a summary of the Jonker Business Machines' proposal for a nationwide information flow network to provide this coordination:

"This proposal rejects the notion of one large 'billion dollar' national information center, in which a large 'multimillion dollar' computer answers questions. (There is a place for the computer of no lesser importance; namely, in the preparation and sorting of data by computer service bureaus, for participants in information flow program.)

"This proposal likewise rejects the notion that the information flow problem requires an artificial universal index language. . . .

"According to the present proposal, a beginning can be made *now* at a very modest cost. Nearly all of the required techniques and equipments are already available or can soon be available.

"The present proposal is based on the use of the basic vocabulary of the English language. These basic words will form the common language or universal index language. According to our proposal it will be possible to enter any present information

collection, whether based on a classification system, an alphabetic subject heading list or any form of key-word indexing, into the nationwide information flow system.

"This could best be achieved by the use of search systems based on the so-called inverted grouping, or term-organized search systems. Probably 90 percent of all search systems now on the market and specifically intended for the information retrieval problem are of this nature. They include small manual systems varying in cost between \$10 and \$100. They also include conventional punched card systems as well as the large electronic general purpose computer. With the use of the proposed indexing techniques all of these equipments become compatible and data can be transferred from one to another at extremely low cost.

"According to the proposal, individual scientists and smaller organizations could index their data and enter them into a system involving \$10 to \$100 in equipment. Copies of these records then flow to data collection centers such as headquarters of societies, or large companies. These data collection centers then exchange information. They will answer specific questions from individuals and disseminate fragments of their collections to individuals upon a stated interest or 'need-to-know' basis.

"The main problem that remains will be the actual opening up of the channels of information: First, within each science or discipline; next, between different sciences and disciplines in order to promote cross-fertilization between the arts and sciences." (Jonker Business Machines, Inc.; pp. 231-32)

Little has been done for social and behavioral scientists directly. Analogies abound, however, as is apparent in many of the foregoing selections. A massive transfer of usable ideas and systems is possible as soon as an effective demand for more systematic documentation and IR in the social sciences arises. And we believe that such a demand awaits only a full awareness of the possibilities.

On Getting a Straight Answer in Tropicana

by ROBERT SCIGLIANO

Some new Asian nations, such as "Tropicana," our pseudonymic subject, have been remarkably inventive in providing obstacles for foreigners in search of information and opinions. These obstacles, along with the more inevitable problems of linguistic barriers and evaluation, foster a large degree of patience, perseverance, and mental flexibility on the part of any successful American researcher.

Robert Scigliano is Associate Professor in the Department of Political Science at Michigan State University. He recently spent two years in Southeast Asia.

A republic was established in Tropicana in the mid-1950's, upon the ruins of European colonialism and internecine warfare. I arrived in Tropicana several years later, to spend two years there in a technical assistance role which included teaching and obtaining information about Tropicanan political institutions and behavior. In my research, which was conducted largely through interviews, I met a variety of obstacles, human and otherwise; these obstacles to research are not found only in Tropicana but in the other underdeveloped and emergent states of Asia as well.

THE LANGUAGE BARRIER

It is obviously a great advantage to be able to speak the language of the country in which research is being done. Very few Americans are able to communicate in Tropicanan, however, even after assiduous and extended study. Fortunately nearly all educated Tropicannans speak a major European language, sometimes better than they speak Tropicanan. Few speak English well.

So an interpreter often must be used. This creates further problems. Often he does not know English well enough to translate narrations accurately, and even if he is fluent in English he still may not interpret accurately. For reasons of national pride he may not translate comments that seem to him to reflect upon his country, its institutions, or its leaders; or he may feel that some

things simply are not important enough to pass on. One recently-suggested solution to this problem is that a third person make a full shorthand transcript of the conversation in the local language, for later translation and comparison with what the researcher *thought* was being said.¹ Unfortunately, time and money for this procedure may not always be available.

Another language problem is that the person being interviewed may not be willing to speak frankly before an interpreter. Police informers are not unknown in Tropicana, and neither the person being interviewed nor the researcher can be sure that the interpreter is not supplementing his salary by working for the police.

UNAVAILABLE DATA

This problem has three facets. First, there is no information—or no reliable information—on many subjects. The Tropicanan National Assembly seldom records its votes, for example. Nobody in Tropicana knows with any precision how much land is under cultivation or what its productivity is for various crops. Population figures, trade union membership, and other essential data are not much more than educated guesses. The absence of accurate information is not always due to the absence of record-keeping, though. Offices of the Tropicanan government burgeon with records, but the data are often incomplete, unorganized, located in

¹ Herbert P. Phillips used this method in anthropological research in Thailand, as reported in his article "Problems of Translation and Meaning in Field Work," *Human Organization*, XVIII (Winter '59-'60), pp. 184-92.

diverse places, and untabulated. Statistical accuracy is, however, improving.

In the second place, much information is considered secret. This includes most data concerning the military, the police and security services, and political activities and parties. Often secrecy extends to subjects that are seemingly public or at least innocuous. One of my Tropicanan students found it extremely difficult to get interviews with leaders of the Government political parties or to obtain any information about these parties in connection with a research assignment she had undertaken. As a result of one written request for an interview she was summoned before the head of the special security service for questioning and a review of her dossier. She survived unscathed, but instead of an interview she was awarded a propaganda pamphlet with the admonition not to concern herself with the activities of the political party in question.

Finally, the Tropicannans place obstacles in the way of anyone trying to get to the sources of information. Any field trip outside the capital for the purpose of interviewing government officials must be approved in advance by the national department concerned, which in turn must inform the Presidency of the Republic. Research within the capital itself is also difficult. I once assigned some of my students to undertake a public opinion survey that was quite limited in scope and entirely innocent in content, as a means of acquainting them with this research technique. I discovered that they had submitted their study to the rector of the institution, feeling that his permission was necessary before they could carry out what they considered to be a fairly risky venture. (The rector presented the matter to the institution's academic council, which in turn passed the responsibility back to the author.)

"I REFUSE TO ANSWER ON THE GROUNDS THAT . . ."

Civil servants in particular are quite reluctant to provide information. Government officials are extremely loath to say anything about the major Government political party,

for example, although its activities permeate the entire Tropicanan administration. They are also sensitive about furnishing information that is public knowledge. In response to my request for the names of the political parties legally permitted to operate in Tropicana (which I already knew), the second-ranking official in the Department of Interior declared himself unable to reveal such information and asked that I address my request to the Secretary of State himself. That gentleman offered his assistance only after three letters and a dinner conversation. The head of the majority bloc in the National Assembly made a similar plea when he was asked to discuss the Assembly's activities; he passed the responsibility for clearance to one of the body's presiding officers. In this case even lengthy correspondence failed to produce cooperation.

When government officials do talk, they tend to give pat answers to questions, to speak in vague generalities, and sometimes to conceal or invent information. The pat answers stem in part from a confusion between the norms expressed in law and regulations, and the actual facts of the matter. For example, questions about relations between the executive and legislative branches of government are apt to be answered in terms of constitutional provision, buttressed by statements of some philosophical principles of democracy. An example of concealed information occurred on a field trip to a distant province, which I made in the company of an American advisor to the Tropicanan police services. The province's police chief was asked a number of questions about police problems and internal security and presented the most favorable picture possible, despite common knowledge that there was illegal and sometimes violent activity on the part of Communists and other dissident groups in his area.

EVALUATING WHAT IS SAID

Some people do talk frankly, however. Their willingness to talk to an outsider may depend on a number of things: whether they are in or out of the Government, for it or

against it, how well they know the person asking questions, and, in the case of public officials, whether or not they are politically secure in their jobs. The politically secure are not necessarily on the top rung; the head of a small but key special presidential unit, for example, was less inhibited in his views about current situations than cabinet and sub-cabinet officials.

People in the opposition talk, and they talk freely despite expressed concern about the state of civil liberties in Tropicana. They also talk at length—interviews with them sometimes lasted three or four hours. Most of them have little contact with Americans and welcome the opportunity to present their case to Americans; furthermore, they are apparently less afraid of disclosure when talking to Americans than when talking to most of their countrymen. Some members of the opposition seemed to think that I, despite my singularly academic pretensions, might somehow influence the machinery of American policy in Tropicana.

But the opposition also presents special problems. Since its members are usually much more voluble than people associated with the Government, it is too easy to rely on them alone for information and interpretation. They may have blades to sharpen. The chasm that lies between them and the Government (they cannot obtain the required authorization to engage in organized political activity) sometimes makes the partiality of their viewpoints especially bitter. Moreover, since they are on the outside looking in, much of their information of what is going on inside is second hand and sometimes little more than gossip. And

some of the opposition leaders still live in a world that was shattered with the end of French domination.

The interviewer becomes very sensitive to the inadequacies of his data. He must remember that many data, including statistics, are imprecise; that much information is based on opinion, clouded recollection, and rumor; and that more of it is *ex parte*, thanks to the reluctance of government officials and government party representatives to talk intimately about politics. There is no patent remedy to these problems. The researcher must remember that in much of Asia directness is interpreted as bad manners or lack of sophistication, even if it does not threaten the social harmony that the Asian frequently seeks in his relations with others. He learns that success in an interview often comes through patience and through alertness to circumlocutions and subtleties that may serve as carriers of important information. He cannot apply the conceptual framework of Western democracy to the pursuit of his data or to the normative evaluation which almost inevitably enters into their analysis. At the same time he must comprehend the impact that the Western democracies have had on societies which are neither Western nor usually democratic—except in constitutional provisions, which express forms or aspirations. Finally, the researcher must escape that brand of cultural relativism which avoids judgment by accepting the actual as the necessary.

CLINICAL PSYCHOLOGISTS AND MORALITY

"So long as we subscribe to the view that neurosis is a bona fide 'illness,' without moral implications or dimensions, our position will, of necessity, continue to be an awkward one. . . .

"Between the concept of sin (however unsatisfactory it may in some ways be) and that of sickness sin is indeed the lesser of two evils."

ORVAL H. MOWER

"'Sin,' The Lesser of Two Evils"

The American Psychologist, XV (May, 1960), pp. 301-04

The Scientific and Humanistic Horizons of a Modern Researcher

by SERGIO DE BENEDETTI

An abstract of "Orizzonti scientifici e umanistici di un ricercatore moderno," by a physical scientist, from the Italian journal IL PONTE, XVI (January, 1960), pp. 44-52.

The attitude of the research worker is in many ways the opposite of that of pedantic and erudite professors, who take delight in adding more and more to their knowledge from what is written in dusty old books, and whose ultimate goal is the collection of wisdom transmitted from the past. For the man of research, the knowledge of the past offers no interest. He finds no charm, no life in what is already known. Stimulation, enthusiasm, and recompense come to him solely from the creation of new knowledge.

One who is not familiar with the world of research may ask: If research workers are not concerned with the applications of their findings, why do they conduct their researches? Why do they choose a career that requires so much education, study, and toil, and that gives so little return in the form of material wealth and social prestige?

This question reminds me of that asked Mallory, who had tried to scale Mount Everest. Why, he was asked, did he expose himself to such risks? Mallory's answer is typically British in its economy of statement: "Because it is there."

Probably the impulse for the worker in scientific research is the same. At some point in his life he learns of the existence of an intellectual Everest that he cannot help scaling.

What are the values of such endeavor? Up to the present the negative effects and the destructive applications of science have always been much less important than the productive, creative, healing value of new scientific knowledge. Pasteur saved more lives than Napoleon destroyed, and penicillin and DDT have been responsible for an increase in the world's population notwithstanding the holocaust of WW II. The

conscience of the scientist can rest easy.

But the situation has changed. With the appearance of the atomic bomb we live in a world of unprecedented danger; the new weapons are capable of destructiveness of such an immensity that for the first time in human history it is definitely possible for more evil than good to result from scientific progress. If, as seems entirely possible, the new weapons could destroy the human species, the only remaining science would consist of unused apparatuses in abandoned laboratories, of books forever closed in deserted libraries.

This terrible situation arises not so much from the advance in science itself as from the lack of advance in the humanistic disciplines.

It has become a commonplace to say that the scientific disciplines have advanced much more rapidly than our knowledge of man and his institutions. Being myself a man of science, I used to feel a certain pleasure in that assertion and I considered it a compliment. But today my reaction is completely different, and the satisfaction has changed to concern and fear: a real and immediate fear lest the irrational management of scientific progress in the hands of a public with little education and a ruling class with little rationality can bring death to me and to my sons.

For our civilization to survive, for any civilization to survive, it is indispensable to maintain the human species and its heritage. For the first time, the precious genetic characteristics of man are in danger; for humanity to continue its advance toward a better future, it is necessary to oppose the destructive uses of scientific progress and to defend the exposed ethical frontiers of science.

New Studies in Behavioral Science and Public Policy

This annotated selection is compiled in a periodic search of new issues of some 240 journals and reviews, including about 75 that are published abroad; recent book announcements; and fugitive materials recently published. Some items of special interest are boxed.

AHMAD, A. J., "Irrigation in Relation to State Power in Middle Asia." *Intl. Studies*, I (April '60), 388-413. The medieval era of semi-arid Middle Asia (now Soviet Central Asia) is explained only partially by Wittfogel's theory of the highly centralized "hydraulic society"; breakdowns in hydraulic society were associated with frequent invasions by nomads, who introduced radically different concepts of the state from that of Oriental despotism.

BAHRDT, H. P., "Die Stellung der 'Technischen Intelligens' in der Gesellschaft." *Frankfurter Hefte*, XV (April '60), 241-48. Industry has accepted and utilized technical intelligence; the intellectual in industry ponders the consequences without recognizing his own handiwork.

BEN-DAVID, J., "Roles and Innovations in Medicine." *Amer. J. of Soc.*, LXV (May '60), 557-68. Scientific innovators typically have been practitioners involved in research and academic teaching as a sideline, or "role hybrids"; with the spread of professionalization, other fields may gain their innovations from such sources.

BATOR, F. M. *The Question of Government Spending*. N.Y.: Harper, 1960, \$3.75. Analysis of public expenditures and "public needs and private wants."

BEREDAY, G. Z. F., and J. PENNAR, eds. *The Politics of Soviet Education*. N.Y.: Praeger, 1960, \$6.00. Essays on party control over Soviet schools and foreign-language teaching in the Soviet Union, a case study of Moscow University, etc.

BERGER, B. M., "How Long is a Generation?" *Br. J. of Soc.*, XI (March '60), 10-25. Considers "the peculiar place the generation concept has come to occupy in the vocabulary of American culture discourse" and attempts to make it more useful for empirical sociological analysis.

BIENAYME, A., "Institutions et Facteurs sociologiques dans la theorie economique." *R. Economique*, XI (May '60), 414-42. The methodological enrichment of economic theory by the conceptualization of social and institutional factors and their analysis, the consequent extension of the domain of economic theory, and the ultimate limits of that extension.

BINKLEY, T., "The Rule of Law: The New Soviet Criminal Procedure." *Amer. Bar Assoc. J.*, XLVI (June '60), 637-39. New principles of non-political criminal procedures (since 1958) include protection for the accused prior to the trial; relief from the burden of proving innocence; a public trial (usually); a record of the proceedings; and the right to appeal (though not without double jeopardy).

BLAKELOCK, E., "A New Look at the New Leisure." *Admin. Sci. Q.*, IV (March '60), 446-67. A study of the activities and time perspectives of shift workers supports the thesis "that the increase in the amount of nonwork time does not necessarily mean an increase in time usable for leisure." Paradoxically, technological advance may have simultaneously produced an increase in nonwork time and a decrease in its usefulness as a commodity.

BLOOD, R. O., JR., "Resolving Family Conflicts." *J. of Conflict Resolution*, IV (June '60), 209-29. Family conflict has quite different sources than world conflict, but mechanisms for preventing and resolving such diverse conflicts have something in common, e.g., "mechanisms of avoidance," "allocation of authority," "equality of treatment," etc.

BODENSTEIN, W., and O. F. RAUM, "A Present Day Zulu Philosopher." *Africa*, XXX (April '60), 166-81. An anthropologists' account of a remarkable innovator who—largely uninfluenced by "Western" or European patterns—has introduced localized changes in the Zulu way of life and has developed his own complex, symbolic philosophy of the nature and destiny of man and his relation to the universe.

BROWN, N. D. *Life Against Death: The Psychoanalytic Meaning of History*. N.Y.: Random House, 1960, \$1.25 (paper).

CAMPBELL, R. W. *Soviet Economic Power*. Boston: Houghton Mifflin, 1960, \$4.75. Historical background of the Soviet economy, its growth potential and efficiency, planning machinery, and incentives used to obtain production.

CARPENTER, E. S., and M. McLuhan, eds. *Explorations in Communication*. Boston: Beacon Press, 1960, \$4.00. David Riesman, Robert Graves, other contributors.

explore various aspects of written, visual, oral, and tactile means of communication and expression.

CASAGRANDE, J. B., ed. *In the Company of Man*. N.Y.: Harper, 1960, \$6.50. Twenty personal memoirs by anthropologists about individuals they have known well in the course of their field work in the Pacific, Australia, Africa, India, and elsewhere.

CHANDLER, T., "Duplicate Inventions?" *Amer. Anthropologist*, LXII (June '60), 495-98. True "duplicate invention" is much rarer than sometimes supposed, most cited examples overlooking connections between the inventors; "each major innovation comes from one man."

CHANG, C., "Konfuzianismus und chinesischer Kommunismus." *Ost Europa*, X (April '60), 228-37. Chinese Communism has long opposed Confucianism as the base of traditional Chinese society; before 1950 opposition was direct but now is more subtle, damning with faint praise.

CHRISTIANSEN, B. *Attitudes Toward Foreign Affairs as a Function of Personality*. N.Y.: Humanities Press (for the Norwegian Research Council for Science and the Humanities), 1960, \$3.50. (paper; trans. from Norwegian). Results of seven years "psychological and hypothetical" investigation of Norwegian attitudes on international affairs and foreign policy.

CLEMENTS, R. J., "Literature by Electronics." *Saturday R.*, July 16, '60. Describes an IBM Mark I with a 60,000-entry dictionary which now translates 1,800 words per minute; predicts a decline in foreign language knowledge; MT may provide a check on human translators.

DANA, R. H., "Three Personality Theories in Search of Adherents." *J. of Psych. Studies*, XI (May-June '60), 224-26. Psychologists have not taken kindly to general theories of personality; three "grand endeavors" that have relatively little attention, despite appearance in book form, are Leary's *Interpersonal Diagnosis of Personality*, Diamond's *Personality and Temperament*—both promising reformulations of psychoanalytic theory—and Rollo May's existentialism, which places equal concern on both experience and behavior.

DAVID, H. P., and J. C. BRENGELMANN, eds. *Perspectives in Personality Research*. N.Y.: Springer, 1960, \$7.50. An international symposium of research on attitudes and behavior, modern methods of clinical psychology, and personality assessment.

DE GRAZIA, S., "Politics and The Contemplative Life." *Amer. Pol. Sci. R.*, LIV (June '60), 447-56. A modern excursus on the Hellenic epistemological theory "that the contemplative life is the ideal life of the philosopher . . . that politics is not necessary . . ." However formidable it may be, we must "start off on a new theory of objectivity that can no longer be equated with detachment alone."

DREIKURS, R., "Are Psychological Schools of Thought Outdated?" *J. of Individual Psych.*, XVI (May '60), 3-10. "Schools can contribute to the progress of knowledge and practice by permitting free comparisons about and controversy between the proponents of well-defined and declared assumptions"—with special reference to schools of personality theory and psychotherapy.

"Dismissal Procedures: A Comparative Study." *Intl. Labour R.*, LXXXI (May '60), 403-35. Main concepts, systems, and practices of dismissal procedures, illustrated by examples drawn from nine nations throughout the world. The formalism and rigid tendencies to be found everywhere are striking.

ECKSTEIN, H. *Pressure Group Politics*. Stanford: Stanford U. Press, 1960, \$3.75. Structure of the British Medical Association; its attempts at political influence and their effectiveness; attitudes toward medical politics on the part of British doctors and the public.

GOLDSEN, J. M., ed. *International Political Implications of Activities in Outer Space*. Santa Monica: RAND Corp., 1960. Transcript of an Oct. 1959 conference, including papers on "Public Opinion and the Development of Space Technology" by G. A. Almond; "On the International Implications of Outer Space Activities" by K. Knorr; and "On Outer Space and International Politics" by K. W. Deutsch.

GROSS, F., "The Sociology of International Relations: Research and Study." *Intl. Soc. Sci. J.*, XII (#2, '60), 269-76. An interdisciplinary framework for research, study, and education "devoted entirely to the study of war and peace, and oriented normatively toward a definite purpose: elimination of war and violence between nations."

GROSSMAN, G., ed. *Value and Plan*. Berkeley: U. of Calif. Press, 1960, \$7.00. Papers analyzing functional and systematic properties of economic institutions that have conditioned industrialization in Eastern Europe, appraising their significance and evolution.

HALL, D. G. E., "Looking at Southeast Asian History." *J. of Asian Studies*, XIX (May '60), 243-53. Until recently SE Asian history has been distorted by Westerners because their major sources have largely represented the very short-lived period of European domination.

HARDER, E. L., "Computers and Automation." *Impact of Sci. on Society*, X (#1, '60), 3-15. Surveys the increasing importance of computers in business and industry, critically reviews the automation of manufacturing and management processes.

HARE, A. P., "The Dimensions of Social Interaction." *Behav. Sci.*, V (July '60), 211-15. A scheme for conceptualizing variables in research on face-to-face social interaction, using as major dimensions form and content of interaction for both personal and interpersonal behavior.

HAUSER, F. M., "Demographic Dimensions of World Politics." *Science*, CXXXI (June 3, '60), 1641-47. General data on past and projected population growth and its implications for crisis and political instability. World population estimates are 2.5 billion in 1950, 3.8 billion in 1975, 6.3 billion in 2000; world urban population percentages are 34% in 1950, 49% by 1975.

HEADY, F., "Recent Literature on Comparative Public Administration." *Admin. Sci. Q.*, V (June '60), 124-54. Survey of recent literature in a four-fold classification: materials on theory and methodology; comparative studies of Western societies; comparative studies of non-Western societies; and useful materials on individual countries.

HOUSIAUX, J., "Renouveau de l'experimentation en science economique: la simulation par les jeux d'entreprises." *R. d'Econ. Pol.*, LXX (March-April '60), 271-300. Lists the requirements of an experimental science of economics, outlines applications of game-theory models to economics, examines differences between actual and simulated decision-making, states some legitimate uses of models in economic science.

INGARDEN, R., "Reflections on the Subject Matter of the History of Philosophy." *Diogenes*, #29 (Spring '60), 111-21. The history of philosophy is an empirical discipline relating to certain empirical facts which occur in time; it must deal with both content and processes.

JAFFE, R. *The Pragmatic Conception of Justice*. Berkeley: U. of Calif. Press, 1960, \$2.50 (paper). A philosophical treatment.

KAPLAN, M. A., A. L. BURNS, and R. E. QUANDT, "Theoretical Analysis of the Balance of Power." *Behav. Sci.*, V (July '60), 240-52. A competitive game of international politics, not intended as a model *per se* but as a device for "playing out" the implications of models and theories.

BOEWE, C. E., and R. F. NICHOLS, eds. *Both Human and Humane*. Philadelphia: U. of Penna. Grad. School of Arts and Sciences, 1960, \$4.50. Appraises American graduate education in the humanities and social sciences. To cope with the growth and complexity of data, graduate education must consider changing from the old idea of studying "subjects" to concentrating on a cultural frame of reference which will make students "not merely apprentices learning skills but disciples inspired to transmit understanding."

KEE, S. J., ed., "State Aid to Public Libraries." *Library Trends*, IX (July '60), 3-128. A collection of papers, with the central thesis that "public library development will advance at a pace compensatory with society's rapid changes" only if there is strong voluntary and State and federal government support. Includes comparative articles on legal responsibilities for public library development in the U.S., Canada, Scandinavia, Nigeria, and the U. of S.A.; surveys of current laws, concepts, and practices in the U.S.; studies of grants-in-aid programs; and evaluation of present and future State aid programs.

KELLEY, S., JR. *Political Campaigning*:

Problems in Creating an Informed Electorate. Washington, D.C.: Brookings Inst., 1960, \$3.50. Shows how various campaign practices affect voters' decisions; summarizes data on the access of campaigners to campaign audiences, the treatment of policy issues in campaign propaganda, etc.; discusses the effectiveness of existing controls on abuse; and suggests measures that might be taken by legislators, the press, and citizen groups to combat abuses and encourage rational voting.

KNIGHT, F. H. *Intelligence and Democratic Action*. Cambridge: Harvard U. Press, 1960, \$3.75. Lectures on fundamental issues in "the free society"—how can critical intelligence be applied to collective decision-making? how can man internalize the constraints necessary for survival?

KNIGHT, O., "The Grand Remonstrance." *Pub. Opin. Q.*, XXIV (Spring '60), 77-84. Historians have judged the impact of Pym's 1641 "Grand Remonstrance" before Parliament; here is an analysis of its manifest content, revealing a preponderance of economic clauses.

KOCH, H. E., JR., R. C. NORTH, and D. A. ZINNES, "Some Theoretical Notes on Geography and International Conflict." *J. of Conflict Resolution*, IV (March '60), 4-14. Develops concepts of international conflict that imply models and hypotheses for the analysis of the "geography variable"; uses these concepts to delineate the relations between geography and international conflict.

KRIEGER, M. H., and P. WORCHEL, "A Test of the Psychoanalytic Theory of Identification." *J. of Individual Psych.*, XVI (May '60), 56-63. Results supported none of three hypotheses based on Freudian theory: that the normal individual identifies most closely with the parent of the same sex; that the neurotic identifies equally with both parents; and that the homosexual identifies with the parent of opposite sex. Rather, normals identify with both equally, neurotics with the parent of opposite sex; there are also differences between men and women.

LACHMAN, R., "The Model in Theory Construction." *Psych. R.*, LXVII (March '60), 113-29. Its function may be representational, inferential, interpretational, or pictorial; an illustration of each type is given, and implications for current methodological problems in psychology are examined.

EVANS, G. H., JR., "Historical Statistics of the United States: Colonial Times to 1957." *SSRC Items*, XIV (June '60), 16-18. Reviews the most recent volume by that title (Washington, D.C.: USGPO, June, 1960, \$6.00). Old subject areas have been up-dated, many new ones added, including business population, communications, consumer expenditure patterns, education, R and D, and social security. All told, the volume has more than 8,000 time series entries.

LEHMAN, H. C., "The Age Decrement in Outstanding Scientific Creativity." *Amer. Psychologist*, XV (Feb. 60), 128-34. Quantifies the rate of growth in scientific achievement, criticizing previous work on the subject; notes that "really great contributions to science have been increasing at a slower rate than have run-of-the-mine contributions."

LESLIE, C. M. *Now We are Civilized*. Detroit: Wayne State U. Press, 1960, \$3.95. The world view of the Zapotec Indians and their desire to be civilized—social change, discrepancies between social ideals and actualities, etc.

LEVINE, R. A., "The Internalization of Political Values in Stateless Societies." *Human Organization*, XIX (Summer '60), 51-58. Compares two African peoples to test the proposition that "To understand and predict the contemporary political behavior of African peoples who were stateless prior to Western contact, one must take account of the traditional political values involved in their local authority systems . . ."

LONG, L. D., "Science and Art in Constructing Achievement Tests." *Pub. Personnel R.*, XXI (April '60), 104-09. Psychometricians run the risk of inbreeding unless they seek the fresh ideas of the subject-matter specialists.

LINDHOLM, R. W., "Accelerated Development with a Minimum of Foreign Aid and Economic Controls." *Social and Econ. Studies*, IX (March '60), 57-67. A policy proposal whose main points are: a money supply increasing less rapidly than productivity passing through the market place (i.e., falling prices); government investment in power, transportation, and education; emphasis on land and gross receipts taxes to reduce impact on prices and siphoning off of profits.

LITWAK, E., "Geographic Mobility and Extended Family Cohesion." *Amer. Soc. R.*, XXV (June '60), 385-94. Survey data supports the hypothesis that extended family relations can be obtained in an industrial, bureaucratized society despite differential rates of geographical mobility. This is so because of communications improvements, because an extended family can provide important aid to nuclear families without interfering with the occupational system, etc.

MCCLOSKEY, H., et al., "Issue Conflict and Consensus Among Party Leaders and Followers." *Amer. Pol. Sci. R.*, LIV (June '60), 406-27. Responses from large samples of Democratic and Republican leaders and followers on 24 key issues give little support to the belief that the two parties are identical in principle and doctrine; leaders "hold sharply opposing views on the important political questions of the day", though "their followers differ only moderately in their attitude toward issues."

MAHONY, F. J., "The Innovation of a Savings System in Truk." *Amer. Anthropologist*, LXII (June '60), 465-82. Initiated in 1951 and spread widely by an island chief, the system depended on solicitations of voluntary contributions, comparable to an aboriginal practice of soliciting food from close friends; considerable funds for capital uses were obtained in regular "savings meetings." Essentially a social invention blending Polynesian and Western influences. For various reasons, enthusiasm for the system declined in the late 1950's.

MATSUMOTO, Y. S. *Contemporary Japan*. Philadelphia: Amer. Phil. Society, 1960, \$1.50 (paper). The practices and customs of individual and group life.

MAYO, H. B. *An Introduction to Democratic Theory*. N.Y.: Oxford U. Press, 1960, \$6.50. A consistent theory of democracy "in the form of a few closely connected principles of operation in a democratic political system, principles which may be cast in both operational and normative terms."

MOHAN, R. P., ed. *Technology and Christian Culture*. Washington, D.C.: Catholic U. of Amer. Press, 1960, \$3.95. Catholic views of relations between technology and civilization.

MORA, J. F. *Philosophy Today*. N.Y.: Columbia U. Press, 1960, \$4.50. A study of conflicting tendencies in contemporary thought. Among its points: "when philosophers get seriously into philosophic business, they tend to deal with unimportant issues, whereas when they deal with important issues they tend to become little philosophical."

MORENO, J. L., "Political Prospects of Sociometry." *Intl. J. of Sociometry and Sociatry*, II (March '60), 3-6. Sociometry "gives a new meaning to the collective and a new meaning to the individual . . . After the collectivization of work comes the collectivization of the individual and the individualization of the collective."

OTTENBERG, S., ed. *Cultures and Societies of Africa*. N.Y.: Random House, 1960, \$7.50. Anthropological readings on African social groupings, authority and government, social values, religion, cultural change, and so forth.

PALOMBA, G., "'Entropia', 'informazione' e 'sintropia' dei sistemi economici." *L'industria*, #1, '60, 3-17. Some questions in political economy can be dealt with by reference to the chemical-physical concept of entropy, e.g., the nature of the capitalistic system and tendencies to monopoly.

PEIFFER, J. M., and F. P. SHERWOOD. *Administrative Organization*. Englewood Cliffs: Prentice-Hall, 1960, \$9.00. Underlying dynamics of public and business organization, seeking a middle ground between the engineering and behavioral approaches.

PANOV, D. I. *Automatic Translation*. London and N.Y.: Pergamon Press, 1960, \$3.50 (trans. from Russian). Problems and an account of work being done at the Institute of Precise Mechanics and Computing Technique and in the Soviet Academy of Science's Institute of Scientific Information.

PLATZ, A., and E. BLAKELOCK, "Productivity of American Psychologist: Quantity Versus Quality." *Amer. Psychologist*, XV (May '60), 310-12. Summarizes two studies; high producers do not do better research than psychologists in general, but "still make a greater contribution . . . by virtue of publishing a greater absolute number of high quality articles."

RAISIG, L. M., "Mathematical Evaluation of the Scientific Serial." *Science*, CXXXI (May 13, '60), 1417-19. An improved bibliographic method offering new objectivity in selecting and abstracting the research journal.

RAMANADHAM, V. V. *Problems of Public Enterprise*. Chicago: Quadrangle Books, 1960, \$4.75. Problems of management, pricing, resource allocation, and public control raised by nationalization in Great Britain.

RAPOPORT, A. *Fights, Games, and Debates*. Ann Arbor: U. of Michigan Press, 1960, \$6.95. A study of conflict as a mode of human behavior on all levels, proposing a method by which all forms of human conflict can be understood, and perhaps controlled.

ROSS, A. M., and P. T. HARTMAN. *Changing Patterns of Industrial Conflict*. N.Y.: Wiley and Sons, 1960, \$6.50. Divergent systems in 15 countries of Europe, Asia, and North America. One major development is "the withering away of the strike, the virtual disappearance of industrial conflict in numerous countries where collective bargaining is still practiced. The other is the transformation of the strike, which in many countries is no longer a sustained test of economic strength but a brief demonstration of protest."

REMINGTON, F. J., "Criminal Justice Research." *J. of Criminal Law, Criminology and Police Sci.*, LI (May-June '60), 7-18. Surveys such research, finds a lack of attention to problems that seldom reach appellate courts, little concern with administrative aspects of criminal law.

RICHARDSON, S. A., "The Use of Leading Questions in Non-Schedule Interviews." *Human Organization*, XIX (Summer '60), 86-89. Experimental use of several types of interviewers "suggests that leading questions in non-structured interviews have useful functions which have been overlooked because of their general condemnation."

ROBINSON, E. A. G., ed. *Economic Consequences of the Size of Nations*. N.Y.: St. Martin's Press (for the Intl. Econ. Assoc.), 1960, \$10.00. Case studies of efficient large and small nations, discussions of size related to administrative costs, development problems, etc.

ROKKAN, S., et al., "Part One: Citizen Participation in Political Life." *Intl. Social Sci. J.*, XII (#1, '60), 7-99. Articles on participation at five levels—elective office, competitive candidature, direct party activity, vicarious participation in political competition, and voting—in England, Finland, France, Israel, New Zealand, Norway, the U.S.

ROPKE, W. T. *A Humane Economy*. Chicago: Regnery, 1960, \$5.00. Advocates "an economy governed by free prices, free markets, and free competition" as a source of extra-economic values and as a means of utilizing individual self-assertion.

ROTHAUS, P., and P. WORCHEL, "The Inhibition of Aggression Under Nonarbitrary Frustration." *J. of Personality*, XXVIII (March '60), 108-17. Experimental evidence "that under a non-arbitrary or reasonable set of frustrations, instigation to aggression was still present, but inhibited owing to the nature of the situation"; the more maladjusted the individual, the more likely he is to react violently to both arbitrary and nonarbitrary frustrations.

SALVADORI, R., "Sapere scientifico e sapere filosofico: cronaca di un convegno." *Passato e Presente*, #14 (March-April '60), 1946-51. Reports a conference at Padova on scientific and philosophical knowing, listing and describing succinctly the major schools of thought found in Italy today.

TANNENBAUM, F., "On Political Stability." *Pol. Sci. Q.*, LXXVI (June '60), 161-80. Centralized government is its own greatest enemy; "the more absolute it becomes the less resiliency it possesses, and . . . its very power is its final undoing."

SCIGLIANO, R. G., "The Electoral Process in South Vietnam: Politics in an Underdeveloped State." *Midwest J. of Pol. Sci.*, IV (May '60), 138-61. Candidates, campaigns, and elections, 1956-59; Vietnam has no strong tradition of elective self-government, and inclines toward autocratic traditions and practices.

SELEGEN, G. V., "Economic Characteristics of the Population in the Soviet Census Questionnaire." *Soviet Studies*, XI (April '60), 353-62. Soviet censuses over the years have varied greatly in methods for measuring economic status; the 1959 census dropped most such questions.

SHILS, E., "The Culture of the Indian Intellectual." *Quest*, #25 (April-June '60), 41-53. The modern Indian intellectual lacks a sense of having any real tasks, a lack that will be filled only as an intellectual tradition takes root.

SMITH, M. B., "Rationality and Social Process." *J. of Individual Psych.*, XVI (May '60), 23-35. Rationality is a social product, but so also is irrationality; "both depend on manipulations of the symbolic equipment, cultural in content and social in genesis, that is distinctive of mankind." Further, there are "possible determinants of rationality and irrationality" which suggest that higher levels of rationality may be socially obtainable.

- SMITHIES, A., "Productivity, Real Wages, and Economic Growth." *Q. J. of Econ.*, LXXIV (May '60), 189-205. An "attempt to bring economic theory into line with the results of recent empirical research concerning economic developing in the United States" by means of a model; calculations "put the burden of proof on those who urge that accelerated growth is . . . easy"
- SNYDER, G. H., "Deterrence and Power." *J. of Conflict Resolution*, IV (June '60), 163-78. Considers deterrence as a type of political power, and probes its nature and meaning. "The deterrent's goal is not to maximize deterrence, or even to minimize insecurity, but to achieve the lowest possible aggregate of 'insecurity' and the expenditure of resources and values to reduce insecurity"

PAPERBACK REPRINTS Among the titles released in Summer, 1960, were several that might interest our readers:

- LASSWELL, H. D. *Psychopathology of Politics*. N.Y.: Viking, 1930, 1960, \$1.65. With afterthoughts.
- NEF, J. U. *Cultural Foundations of Industrial Civilizations*. N.Y.: Harper, 1958, 1960, \$1.25.
- SUMNER, W. G. *Folkways*. N.Y.: New American Library, 1960, \$.75.
- TEGGART, F. J. *Theory and Processes of History*. Berkeley: U. of Calif. Press, 1918, 1941, 1960, \$1.50. A classic work on historiography.
- WARNER, W. L., et al. *Social Class in America*. N.Y.: Harper, 1949, 1960, \$1.60. An expanded edition of a standard "manual of procedure for the measurement of social status."

- SPILLER, R. E., ed. *Social Control In a Free Society*. Philadelphia: U. of Penna. Press, 1960, \$4.50. Five lectures: L. C. Eiseley, "The Ethic of the Group"; C. G. Hempel, "Science and Human Values"; G. Seldes, "Mass Versus Coterie Culture"; G. J. Stigler, "Prometheus Incorporated: Conformity or Coercion"; W. Hurst, "Law and the Limits of Individuality."
- SWANSON, G. E. *The Birth of the Gods*. Ann Arbor: U. of Mich. Press, 1960, \$4.95. A sociological theory of the origin of primitive beliefs in deities, open to empirical verification, based on analysis of the religions of 50 primitive peoples.
- VENTURI, F. *Roots of Revolution*. N.Y.: Knopf, 1960, \$12.75 (trans. from Italian). The definitive history of the growth and development of the populist and socialist movement in 19th century Russia.
- VILLEY, D., "Le jeu des interets dans les relations economiques internationales." *R. d'Hist. Econ. et Sociale*, XXXVII (#4, '59), 385-406. An interpretation of international economic relations in terms of a concept of political economy whose central idea is *interest*.
- WALLACE, K., "Factors Hindering Mate Selection." *Soc. and Social Research*, XLIV (May-June '60), 317-25. Numerous such hindrances are deeply imbedded in American culture and are among the causes of high divorce rates and poor family stability: conservative attitudes in boy-girl relationships; cultural emphasis on beauty and sex; social stratification and segmentation; urbanization; competitive courtship; and hereditary differences.
- WIGHT, M., "Why is There no International Theory?" *Intl. Relations*, XI (April '60), 35-48. There is but a meager tradition of speculation about relations between states: "whereas political theory generally is in unison with political activity," there is "a kind of disharmony between international theory and diplomatic practice, a kind of recalcitrance of international politics to being theorized about."
- WOLFE, B. D., "The New Gospel According to Khrushchev." *For. Affairs*, XXXVIII (July '60), 576-87. "The past must be so written as to show that it was pregnant with the present and the future, certain with the future's certainties." This principle is illustrated by a chronicle of the various histories of the Communist Party of the Soviet Union, notably Stalin's "Short Course" and the 1959 Khrushchev version—the latter longer, more depersonalized.
- WOLFE, D., "Government Organization of Science." *Science*, CXXXI (May 13, '60), 1407-17. Organizational objectives and alternatives of a possible U.S. Dept. of Science and Technology, accepting the general concept but maintaining that "each specific proposal . . . has serious weaknesses and seems to create or augment about as many difficulties as it was intended to solve."
- WOLMAN, B. B. *Contemporary Theories and Systems in Psychology*. N.Y.: Harper, 1960, \$7.50. A survey of general psychological theory encompassing behaviorism, psychoanalytic theory, gestalt psychology, and theories influenced by the cultural sciences, and noting methodological problems.
- WOODBURY, C. A. *Framework for Urban Studies*. Washington, D.C.: Highway Research Board, 1959, \$1.20 (paper). An analysis of urban-metropolitan development and research needs.
- YANNIN, V. L., "Modern Methods in Archeology: The Novgorod Excavations." *Diogenes*, #29 (Spring '60), 82-101. This Soviet account of 30 years of intense work, in a settlement a thousand years old, suggests that Soviet archeology is as modern in its methods and as unbiased in its conclusions as is Western archeology.

Industry's G2

Businesses resort to many means for securing information about their competitors. The process is necessary and desirable, but some of the means are less so. If competitive intelligence systems were better coordinated, executives might have less cause to stray beyond legal and ethical boundaries in their intelligence activities. This article, which summarizes a more lengthy report,¹ first appeared in somewhat different form in The EXECUTIVE, III (September, 1959), pp. 3-6.

How do businessmen get information on their competitors? To answer this and related questions, students of Harvard's Graduate School of Business Administration personally interviewed some 100 executives, primarily men who were vice-presidents or presidents of their companies. They obtained further data from 187 completed questionnaires (of 488 sent out) from industrial corporations throughout the country.

NORMAL METHODS OF INFORMATION COLLECTION

Competitors' prices, products, research and development, and general company operations are crucial data for a business concern. Most of this information is obtained through the personal contacts of company personnel with other industry representatives. Company salesmen, research personnel, and corporate executives all are active in securing such data, through their contacts with competing salesmen, customers, suppliers, and executive counterparts in other organizations.

Intelligence developed through personal contacts is supplemented by large bodies of published information. Industry trade associations regularly distribute trade statistics and news of products, companies, and personnel. Publicly held corporations must issue detailed annual reports to their stockholders, and the government offers ever-widening coverage of commerce statistics. Private business services and the mass media are still further sources of information.

Nevertheless, many companies fail to

make use of these widespread sources of information or to coordinate the data they do obtain for the most effective use. Among the corporations surveyed, 40 per cent analyze information in group meetings and 37 per cent assign information interpretation and correlation to one person. In the remaining companies information is interpreted by several people with little coordination.

CONTROVERSIAL METHODS OF INFORMATION COLLECTION

An essential and controversial question in many industries is how much technical know-how a man can bring into a new position when coming from a competing firm. A number of executives said that some companies in their industry would hire an employee from a competitor primarily to get specific proprietary (i.e., confidential, non-patented) information about that company's products, processes, or corporate plans. Most executives thought, however, that at least in large corporations hiring for the purpose of learning a competitor's trade secrets was not common, and that the usual reason for hiring a man from another company within the industry was talent.

Another area of controversy centers on patent protection. Such protection is highly important to many organizations in preserving a competitive advantage, yet the possession of a patent does not prevent its unauthorized use by a competitor. Also, the patent-holding organization must develop substantiating evidence of an infringement before it can initiate action against a suspected infringer. While most large com-

¹ *Competitive Intelligence: Information, Espionage, and Decision-Making*, a special report for businessmen prepared by Burton H. Alden, Byron C. Campbell, Thomas W. Courtney, Anilkumar M. Chandaria, Albert A. Ewald, John A. Griner, and James B. Moffatt, published in Watertown, Massachusetts, by C. I. Associates, 1959 (78 pp., \$10.00).

panies employ permanent legal counsel to handle patent establishment and policing, many smaller companies hire patent lawyers only when new patents are contemplated or an infringement is suspected. In the case of some *product* and most *process* infringements, the investigator must gain access to the competitor's plant to get concrete information on the suspected violation. He generally does so without the knowledge of the company being investigated, and the operation is usually known as "undercover investigation."

Once a company has evaluated the information on a suspected violation, it must decide what further action is necessary to protect its patent position. If the evidence of infringement is clear, the company can ask the competitor to license the patent, order the competitor to cease and desist, or file an infringement suit. Some companies and industries have tried to cut down the number of infringements, whether accidental or intentional, through closer contact with the U. S. Patent Office, inviting competitors to see new products, licensing, and the pooling of know-how.

What is the general extent of business espionage? Of the executives interviewed, 27 per cent said that spying or other types of undercover information collection had recently been discovered in their industry. A fifth of them thought such activity was increasing, compared with one in ten who thought it was decreasing; the remaining 70 per cent (19 per cent of the total sample) thought there had been no change. Since the undercover operator goes to great lengths to remain undetected, however, the executives' estimate of the extent of corporate spying may be too conservative.

Whatever the actual extent of espionage, most executives went on record as in favor of limiting methods of information gathering. The vast majority said the gathering of information should cease when it conflicts with legality or common morality, though some pointed out the difficulty of making sharp distinctions between the ethical and unethical. A few executives believed it was

occasionally necessary to get information through unethical but legal channels. A handful said they would use illegal methods if the situation were one of *critical* competitive information.

COMPETITIVE INTELLIGENCE FOR PLANNING

Some form of competitive intelligence is necessary for both short- and long-range planning, of course. An effective intelligence system can be readily established.

The first question the executive must ask himself is: What information do I *really* need to make a decision? The *specific* information required in each decision-making area must then be isolated, and the *total present* resources should be analyzed to determine presently available competitive information. If existing channels cannot supply sufficient information, the executive must decide whether additional knowledge is important enough to justify further expenditures, and whether more controversial methods of securing information will be used.

He must then determine the most logical group or person to assemble this data. Effective operation requires a central coordinating point to which all competitive information will be channeled. In effect, the coordinator grades the importance of data to determine what information should be relayed on and to what corporate sector. The final step takes place in the sector, which must analyze, interpret, and decide how to use the information so as to best strengthen competitive position.

Competitive intelligence should play a significant role in the business decision-making process. However, a proper balance must be maintained in the intelligence activity; the organization which overemphasizes the importance of competitive information may stifle the creativeness of its own people. The concept of competitive intelligence represents but one of the many steps in the decision-making process. Nevertheless, if well coordinated, the collection of competitive information can lead to consistently better corporate decisions.

Social Invention in the Age of Controls

by ALFRED DE GRAZIA

The two-century-old concept of social invention can help behavioral science see its tasks more clearly in the Age of Control. All invention is fundamentally social, for it involves a human purpose, function, and communication system. Social invention is new applied social science. It is most needed, and most likely to flourish, in the fields of communication science and the reform of political institutions. Communism, traditionalism, and authoritarianism are enemies of behavioral science, but, more than that, of creativity, the generative factor in invention.

Among the many new concepts thrust forward by the French Enlightenment was that of the *social invention*. Examples of the deliberate design of human relations to achieve fairly specific aims occur readily to historians of the period. For instance, in the early 1770's J.-C. de Borda, who was to father the metric system, invented a system of electing officials whereby the winning candidate must be the majority choice. Following the Revolution, a new law of patents granted rights of property to inventions of social practices. Insurance schemes, lottery plans, and other procedures were subsequently patented, but, owing to difficulties of definition that semanticists and sociologists of a later day might have foreseen, the category of social invention was soon removed from the purview of the law.

Patent law, then and now, is a specialized juridical phenomenon that obscures more than it reveals of the nature of invention. Essentially it promotes the view that invention is gadgetry. It disguises the larger invention complexes by directing attention only to their superficial aspects. By preoccupation with the static and tangible elements in new developments, it conceals the interhuman and the mechanical-human relations that are most important in social and technological change.

THE NATURE OF INVENTION

The major principle in the study of invention is that all invention is fundamentally social. For certain purposes it may be useful to distinguish the mechanical or the chemi-

cal invention from the "social," as when any subject-matter is subdivided to permit closer scrutiny. Otherwise the laws of invention apply to the mechanical and social alike. All invention is social in that the core of invention consists of asserting a *goal*, prescribing a human *function*, and *communicating* the resulting activity; these are social and psychological processes. Meanwhile, mechanical, chemical, and human interactions, as they are manipulated and arranged, constitute the *specifics* of invention.

The fundamental objection to this theory may be presented in an extreme form to dispose briefly of the less challenging illustrations. Consider the process whereby Robinson Crusoe invents a trap for animals. The trap has *preconditions*, *social consequences*, and *techniques*. Certainly the *preconditions* of this invention are thousands of years of inventiveness among men, transmitted in encapsulated form to Crusoe through formal and informal education. So long as he remains alone on the island the *social consequences* of his invention might seem to be nil; even in this instance, however, three familiar factors suggest that a place for social consequences had best be maintained. First, others may arrive and be affected by the trap, or by its effects on the ecological balance, beginning with the simple scarcity of the trapped animal. Further, Crusoe himself may experience such consequences, and it makes no difference to the unwitting trap or altered natural balance that they are affecting Crusoe himself rather than another's (and therefore "social") situation. Finally, intracommunication within Crusoe's psyche

is in many ways the equivalent of intercommunication.

However, the case in point must be examined with precise reference to whether the invention *itself*, as *technique*, can be considered social. Here again the answer is yes, as the preceding paragraph implies. In order to invent a trap, Crusoe must project his own behavior and traits into a future situation in which the trap plays a role. He exercises literally dozens of generalities about his own behavior, and these are generically the same as the propositions about the behavior of others that he would exercise if others were present.

Fundamentally, all invention is thus seen to be social invention because it is manipulative of the environment, and everything so instrumental rests upon a value, a method, and a communication of result. To clarify this a definition of social or behavioral science is required, which in turn leads to a definition of social invention.

Social science consists of verifiable propositions about human behavior. Ultimately dependent upon the very nature of man himself, the propositions nevertheless may be considered objective, that is, positivistic, when posed in descriptive form. The so-called natural sciences themselves are based upon man's peculiar ways of knowing and acting in the universe, and thus are the data of social science; but the specialized work that they do is so circumscribed by accepted rules of behavior and logic (scientific spirit and method, so-called) that their materials seem obviously to be "natural phenomena."

Applied social science must be understood in order to grasp its relation to social invention. It invariably and directly introduces the problem of values. The propositions of applied social science tell how to obtain a given condition of the human or natural environment by the manipulation of factors according to principles of social science. Every new movement of man in relation to his social self or to others then constitutes social change, some of which is purposive, some of which is unconscious or unintended. When it has purpose, it may be more or less scientific in its rational calculations, *i.e.*, its

knowledge of social science, its logic, its clarity of goal, and modes of feeding its results back to itself or communicating them to others. Where a serious attempt at scientific method is present, social change becomes applied social science.

Such applied social science may be *routine*. It may be *innovative*. It may finally be social *invention*. Such discriminations may be made according to criteria of newness. The fundamental social complex of *creativity*, always of some concern and now of great concern in nearly every branch of activity, is involved. Routine consists of the repetitive modes of adjusting human relations, innovation of the application of routinized procedure to new situations or to old situations with new or amended procedures that are "not too different" from the known. And, of course, social invention comes to be defined as a *new method of applied social science*. It consists of a new way of arranging human relations to achieve a goal. Its heart is creativity, but creativity applied to social change.

In truth, examples of social invention abound. Institutions such as the family, the State, the church, may be considered to have evolved unconsciously for the most part, according to laws of humanity in society. But inasmuch as man's control over his environment seems to take place in small steps rather than large, numerous social inventions seems to have been attached to these slowly evolving complexes.

These thousands of inventions represent an underlying development of the urge to control life, rationalism, instrumentalism, scientific method, and elaborate mechanics of publicity, of influencing people, and of distribution of products. It takes only one application to make an invention, but obviously the study of inventions in any practical sense will be concerned largely with "successful" inventions, whose users are many. Whenever, in some part of a moving complex of activities centered about some goals, an accelerated incidence of purposive change by an unfamiliar method is sensed, the term invention is cited. In social behavior as in physics, however, the invention

itself is always but a visible extension, usually assignable to a man or a group of men in a certain time period, from an underlying social process whose explanation is perhaps no more, but certainly no less, complicated than that of any other historical event.

THE AGE OF CONTROL

Our age may be called the age of control. By the same token it may be called the age of social inventions. Man, no longer simply rationalistic, no longer very spiritual, no longer prone to direct violence, no longer believing in nature *per se*, very often now turns in upon himself and out into a world and universe for an understanding of "how to do what to whom." A heightened sensitivity to the need for self-determination in both group and individual roles is seen in one segment of mankind. Another segment meanwhile acquires a great urge toward amassing influence over human conduct. (The segments are not clearly distinguished by geography or the ecology of ideological conflict in a nation.)

The master science of the century to come almost certainly will therefore be communication, which in its practical and theoretical aspects already evidences a joining of all the disciplines, both natural and behavioral. *Par excellence* it is an area where social invention is proceeding apace, inextricably socio-mechanical, socio-electronic, and socio-physical.

A second great area for development by social invention is political institutions. It is among their disciples and enemies, rather than in their own thoughts, that the wise men of the past seem to expound rigid, eternal behavioral prescriptions. They grope, Aristotle and Aquinas as much as John Dewey, for a way of phrasing man's experience and needs in operational, while ethical, terms. To the extent that the public mind, and particularly the activist mind, is permeated by behavioral science, rational politics becomes possible and a complex of social invention may follow. (The readiness of any given group for change can already be

tested through means such as Ronald Lippitt and others of the "group dynamics" movement have developed.) To be levelled are huge medieval walls of "either-or" and "yes-no," and in their places are to be constructed electric barriers, flexibly designed to limit when necessary, to free when unnecessary.

Our age is already a creative one. To be exact about comparisons with other ages would be impossible at present. Available lists of numerous "social inventions" indicate that we are "socially" as well as "mechanically" creative. A more important question is whether we are inventing what we should be. To this we may not be so ready to respond in the affirmative. The major reason for believing that we are in an inventive age is the large-scale effort of widely-scattered men and groups to organize and control people's work and beliefs. A solid basis for reliable control of behavior is available. From this base social invention can flow. Increasingly the elite is ready to receive social invention—or at least the American and free European elites are.

The Communists, traditionalists (in the Mannheim sense), and authoritarians (in the Sanford-Adorno sense) everywhere are inimical to the idea of progress through social science. The policy of social "drift," often espoused by traditionalists and humanists, is an invitation to primitive controls whose answer to values is non-values, to belief is nihilism. There is yet to be proposed any system of beliefs, of any good degree of clarity and permanence, to assert validly that science and invention will destroy it, and, conversely, that it cannot use science to further its aims. If this position has often been held in the past, it is because the nature of science is misunderstood or because the system is a sham. It is not only true that applied science must always be the handmaiden of ethics. Ethics must also seek a cure for the ills of science in more social invention. The age of control and the multiplication of social invention are our best and most humane response to the threats of control and the threats to freedom.

ET AL.: Prophets and Signs of the Times

False Prophets and True Prophets. The instinct of the people is to look for prophets, and, of course, there are plenty of people who are willing to pose in this capacity. The false prophet is usually an honest gentleman whose main error is in posing as a prophet. One fundamental difference between him and the true prophet is in the matter of popularity. The false prophet cannot live without it, the other must. One who seeks popularity must obey the laws of popularity, but the true prophet is mastered by other considerations. He is charged with something he must deliver. He may be keenly sensitive to the offense and pain which truth so often inflicts; but he has no choice. To win acceptance is not his problem. His whole responsibility rests with utterance. Utterance is so important to truth that he cannot rest until he speaks. He may not talk much about his destiny, but he is conscious of its burden, of the inescapable urge which forces him to the thing that he was born to do. He may shrink from its consequences, but he cannot shrink from the duty. He knows that utterance is the sharp flying wedge of truth which must infallibly cleave its way through all opposition to a general acceptance. He may not see this at once. He may only see through all his career the gathering forces that oppose his truth; but he knows that this very gathering of opposition is providential, for it is being gathered and headed up so that it may be destroyed together.

The Hidden Roots of Tomorrow. Reading the signs of the times is a method of information open to every one. The two essentials of wisdom are a knowledge of fundamentals and an awareness of their development. To know *what is growing* and in *what direction* it is growing comprises the highest providential wisdom—it is the ability to read the signs of the times, not of the times that are, but the times that are to be.

People who try to understand only the immediate times are somewhat behind the times. Those who know the times at all began to understand them before they existed. Signs of the times, then, are the signs of the times to come. The signs of the times that now are were given long ago. By the time they emerge into actuality they are no longer signs, they are the times themselves. It is one thing to see a thing, another thing to see through a thing. There is very little of life on the surface. We see to-day as the product of distant yesterdays; yet hidden in to-day is a root of distant to-morrows, and it is the man who knows the coming to-morrows who really sees most of life. To read the signs of the times one must do a kind of original work—read what few are reading, or, I might say, read what isn't yet printed, reach original conclusions, deal with fundamental values which lie beneath and behind all other values. One leads the way for himself instead of following others, one looks to principles, to a deep foundation upon which rest the changes that afterward occur. The signs of the times demand our learning a new language, observing fundamental things, doing original thinking, getting at naked facts, and being sure that they *are* facts, not simply theories. Life is a river which constantly changes its course, and the way of understanding is to follow this river—not the dried up and deserted river bed.

HENRY FORD

My Philosophy of Industry
New York: Coward-McCann, 1929, pp. 90-94

IN THE NEWS

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GOVERNMENT AND SCIENCE: • U.S. Office of Ed. *Language Development Sec.* granted \$47.7M to George Washington U. for inventory of linguistic network (900 languages) in sub-Sahara Africa. • Early in August the Defense Dept. removed "classified" labels from c. 30,000 reports embodying WW II work of the *Office of Sci. Research and Development*.

THE UN AND SOCIAL SCIENCE: • UN team headed by Dr. Willard Thorp begins 2½ mth. survey of Cyprus economy in Sept. • UNESCO's *N. Amer. Conf. on Social Implications of Industrialization and Tech. Change* met in Chicago, Sept. 6-13. • Planned UNESCO meetings: *Experts on Soc. Sci. Teaching at Pre-University Level*, Paris, Oct. 26-28; *Seminar on Timing and Balance Between Econ. and Social Development*, Mexico City or Santiago, Dec.; *Symposium on Social Aspects of Econ. Development in Latin Amer.*, Mexico City, Dec.

UNIVERSITIES: • Anticipated U.S. higher ed. enrollment in 1960-61 is 3,980,000, up from 3,750,000 last year. • Scholar exchange: 1,777 faculty members from 339 Amer. colleges, universities had overseas research or teaching assignments in 87 countries in 1959-60 (Mich. State U. led with 147), major sponsors being ICA, corporations, foundations, foreign govts., U.S. Army; foreign scholars at U.S. institutions on Smith-Mundt grants totaled 543. • Law profs. are highest paid faculty group in NY State, \$11.8M per yr. median. • Robert College (Istanbul) has new *School of Bus. Admin. and Econ.*, partly financed by \$150M from Rockefeller Bros. Fund. • To enrich background of both scientists and humanists, Rensselaer Poly. Inst. now offers the BS in humanities and soc. sciences.

FOUNDATIONS: • Major Rockefeller F. grants, 2nd quarter 1960, incl. \$300M to *Natl. Bureau of Econ. Research* for 10 yrs. continued study of recurrent problems of intl. economics; \$150M for 6-wk. research seminar at the *Hague Acad. of Intl. Law*; \$86M to continue SSRC's fellowship program in legal and pol. theory; \$59M to *Inst. of Econ. Research* (Hitotsubashi U., Tokyo) to continue analysis of data on Japan's econ. growth, 1868-1926; \$40M to J. A. Cohen (U. of Calif. School of Law) for Communist Chinese legal studies; \$36M to *Center for Studies in Econ. Development* (U. of the Andes, Bogota) to continue research and training; \$25M in partial support of intl. conf. on input-output analysis sponsored by Harvard's *Econ. Research Project* and the *UN Secretariat*. • In 1st half of 1960 Rockefeller made some 40 grants to individuals for research related to soc. sci., e.g., \$11.3M to L. L. Fuller (Harvard) for research on forms of social order; \$8M to L. R. Klein (U. of Penna.) for research on Amer. econ. structure; \$15M to H. J. Muller (Indiana U.) for research on the hist. of freedom; \$10M to K. Tsubaki (Juntendo U., Tokyo) for research on the genetics, anthropology of selected Japanese families; \$8M to S. J. Eldersveld (U. of Mich.) for comp. study of pol. parties, interest groups in U.S., Netherlands, Belgium; \$8.5M to Martin Wight (London School of Econ. and Pol. Sci.) to complete research on "The Anatomy of Intl. Theory." • Carnegie Endowment for Intl. Peace in Sept. began a \$250M program of diplomatic fellowships, giving for service officers of 14 nations 1 yr. grad study at Columbia, Harvard, Geneva centers of intl. affairs. • Carnegie Corp. gave Harvard \$250M and Carnegie IT \$175M for research on thought processes; Harvard \$30M for research in soc. theory; Princeton \$90M for research on internal welfare and \$75M for research in theory of games and econ. behavior; U. of Mich. \$57M for research on econ. consequences of disarmament; *Amer. Library Assoc.* \$45M for development of standards for State libraries. • Ford F. recently gave Columbia \$5.5 million, Harvard \$5.6 million, U. of Calif. \$4 million for work in non-Western areas "where American competence has been limited." • For programs related to foreign areas and processes of econ. and social development, Ford also gave \$1 million to Mich. State U., \$400M to Syracuse, \$300M to U. of Pittsburgh, \$225M to MIT, \$200M to Spelman College, \$100M to U. of Oregon, \$24.5M to Wells College. • On Aug. 29 Ford granted \$615M to S. Vietnam "to strengthen fiscal and budgetary management procedures," through use of consultants (to be recruited by *Brookings Inst.*), computers, fellowships for Vietnamese personnel.